THE IRON AGE

June 18, 1931

Start Apprentice Training Now	1957
Seamless Tube Mills at McKeesport	1962
Cooperative Technical Research	1967
Materials Handling for Mass Production	1972
Studying Life of Open-Hearth Roof	1976
Golden Gate Bridge	1979
Making Lead-Covered Telephone Cable	1980
Chromium Plating for Wear Resistance	1982
Controlling Surplus Stocks	1985
Dr. Haney's Page	2005

▼ ▼ ▼

New Equipment	1989
News	1993
Personals and Obituaries	2002
Editorials	2006
Markets	2009
Construction and Equipment Buying	2030

▼ ▼ ▼

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We, too, are believers in printing monogamy: that a page of paper is entitled to but one page of type. Bigamous action on the part of our presses is not tolerated. Of course, machines, like humans, make mistakes at times, but the missteps of a press are usually buried in the press room.

If once in a blue moon an imperfect copy does get into the mails, consideration should be given to the fact that The Iron Age is edited and printed with something approaching newspaper speed. Tuesday's happenings are recorded in the paper that is in the mails on the way to its subscribers the following morning (Wednesday).

Presses that run all night long make possible this quick news service.

—A. H. D.

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IRON AGE PUBLISHING CO.
239 West 39th Street,
New York, N. Y.

Cable Address: "Ironage, N. Y."

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UNITED BUSINESS PUBLISHERS, INC.
New York, N. Y.

District Offices:
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Member, Audit Bureau of Circulations
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Published every Thursday. Subscription Price: United States and Possessions, Mexico, Cuba, $6.00; Canada, $8.50; foreign, $12.00 a year. Single Copy 25 Cents.

76th IRON AGE YEAR

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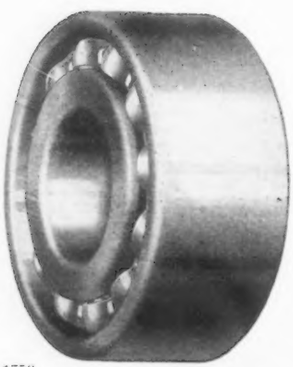
New Departure bearing races are forged of selected steel. Forging makes them dense and tough . . . controls grain-flow . . . brings longer bearing life. Forging is typical of all the operations that follow in the making of a New Departure Ball Bearing. Each move is carefully aimed at the bull's-eye of quality. . . We have a booklet which deals with certain interesting phases of New Departure manufacture. You can read it in six minutes. Ask for booklet "Q" and we will gladly send it to you. The New Departure Mfg. Co., Bristol, Conn.; Detroit, Chicago, San Francisco.



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N O T H I N G R O L L S L I K E A B A L L

THIS ISSUE IN BRIEF

NEXT WEEK

THE answer to unemployment is not an extension of Governmental bureaucracy, in the opinion of most American business men. But opposition to such State intrusion into industrial relations is not enough. A "do nothing" policy always opens the way to the enactment of legislative remedies, if European experience can be taken as a guide. Constructive action must replace inaction, according to a writer in our next issue, or American industry will have to accept legislation conceived and forced on to the statute books by politicians and agitators.

Don't Wait Until It Rains to Fix a Leaky Roof

Some manufacturers won't start an apprentice-training plan when the plant is rushed with work, because they have no time to bother with it. When business becomes slack, they excuse themselves on the grounds of lack of energy, enthusiasm, and work. Many successful training programs have been started in depression periods. For there is time for thought and discussion, just exactly what is required. Starting a few apprentices at a time will not antagonize the shop organization. The training is not expensive. It pays for itself as it goes along.—Page 1957.

* * *

Heat Loss Through Roof Runs High Toward End of Open-Hearth Campaign

During the first few days, before the bricks are glazed over on the inner surface, the gases penetrate through the joints and raise the temperature through the brick and at the outer surface. The loss decreases for a time, and then rises as the age of the roof increases. The range is 3.21 to 8.5 per cent roof heat loss in proportion to the total heat consumption of the furnace. The life of the roof depends mainly on the volume and kind of slag-forming substances on the brick. Accordingly, resistance to attack by slag, lime or ore dust is of great importance.—Page 1976.

* * *

Avoids Bends, Dents and Other Damage Which Cranes Sometimes Give to Thin-Walled Pipe

In new seamless tube mills at McKeesport conveyors with live rollers, or with alternate live and idler rollers, cross the shop between operating units or processes in such a way that the feed of the material is most flexible. Practically never is it necessary to pick up the pipe by means of a crane, until the pipe is ready for loading. The pipe can be fed to any pair of threading machines, regardless of location and without confusion or piling up of surplus stock. The tables are large enough to take care of momentary surpluses. Thus the roller conveyors make it possible to operate at the highest average efficiency.—Page 1964.

* * *

Look Out for "Competitive Dynamite" in Cooperative Research

Dr. Speller of the National Tube Co. suggests that cooperative research work be centered in a research board, under the auspices of an association of iron and steel manufacturers. But, says Dr. Gillett, "it would take a wise and broad-minded committee of really big men to steer an investigation that would advance the joint knowledge of fundamentals and avoid touching off the competitive dynamite."

* * *

Loop Conveyor, Costing $49,000, Pays for Itself in Six Months

It connects all departments of the General Electric refrigerator plant, and is about three-quarters of a mile long. Handling costs have been cut, spoilage has been reduced, floor space saved, and inventories cut. It serves as a traveling stockroom, handling parts ranging in size from a small wood screw to a 75-lb. refrigerator top. The system of mounting is so well developed and gives such flexible operation that such a conveyor could be built up to 20 miles and still operate without distress.—Page 1972.

* * *

Keeps Chromium Loss Low in Electroplating

Production fixtures to hold gages, shafts, etc., to be chromium-plated for wear resistance, are designed to insure uniform current distribution and a minimum loss of chromium through useless deposition upon the work-holders. Wherever practicable joints are made by welding. Wear resistance of plated parts is about three times that of hardened steel. Manufacturer of pneumatic equipment finds his chromium-plating department pays a profit. Chromium-plating is used on a wide variety of shop repair jobs.—Page 1982.

* * *

How to Keep Down the Amount of Money Tied Up in Inactive Stocks

A special department in the Westinghouse East Springfield plant has charge of disposing of surplus stocks. Each department reports its surpluses to the inactive stock department which issues a bulletin to engineering, shop, sales and other departments. The items are also advertised on bulletin boards throughout the plant. Suggestions from employees are solicited. If the stocks can not be utilized in the works, they are advertised throughout the other plants of the company and to the original suppliers. Only after every other possible sales channel has been investigated does the material get into the scrap classification.—Page 1985.

NEW BRITAIN

SHOP EQUIPMENT

New Britain Die Truck

All Steel

THIS extremely strong and rigid truck has been built as a result of numerous requests for a suitable means of transporting heavy dies to and from the presses. Standard height is 32" but may be had in any height desired. The top is 24" wide by 36" long and perfectly smooth as no bolts or screw heads protrude through top. The legs are regular New Britain Heavy Duty bench legs mounted on four casters, two swivel and two fixed. The legs are tied at bottom with heavy angle iron tie bars. The stringer on back is integral with top, adding greatly to the rigidity of the truck. The standard finish is green.

Prices on any quantities given promptly.

New Britain Elevating Press Feed Table

THIS stand is a most convenient aid to the operator in feeding flat stock into presses. Production is speeded up and costs lowered because of the labor saved.

The table is made in two types, with flat or with tilting top and with or without lower shelves.

Height is adjustable to suit your requirements.

The table is made of heavy stock, rigidly reinforced and guaranteed to stand up under all kinds of working conditions.

Various sizes to suit.

Standard finish is green.

Prices on any size or quantity.

New Britain Machine Stand

All Steel

SIMPLICITY of design, lightness, ruggedness and durability are the outstanding features of this machine stand. Its greatest feature, however, is its convenience in use.

These stands, placed at each machine, save the operator many minutes each day and easily earn the cost in a short time.

The design lends itself to variations in any dimension, length, width or height. Stands may be had in knockdown type with one, two or three trays, on feet or casters as desired. Drawers may be added also.

Trays and legs are of ¼" steel.

Lighter trays may be had if desired.

Casters are the quick facing type. Standard finish is green. These stands are made in a wide variety of sizes.

Prices quoted on any size and quantity.

THIS Company has originated and built innumerable items of Special Shop Furniture Equipment for all types of industries. Its past experience places it in an enviable position to solve your problems. Our Engineering Department will gladly cooperate with you if none of the standard equipment listed below meets with your requirements. Bulletins on any or all of the following units will be mailed on request.

Other units made by this Company include:

Bench Legs—Single and Double
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The New Britain Machine Company

"Shop Furniture Originators" **New Britain, Conn. U.S.A.**

..THE IRON AGE..

NEW YORK, JUNE 18, 1931

ESTABLISHED 1855 VOL. 127, No. 25

START APPRENTICE TRAINING NOW

By C. J. FREUND

Apprentice Supervisor, Falk Corpn., Milwaukee

IT is a trait of human nature to do every day only that which demands immediate attention and to put off continuously, sometimes for years and years, whatever is not imperative, although it may be desirable, or even necessary, in a broad way.

For instance, manufacturers meet their payrolls promptly, pay taxes on time, repair ladle cranes which have broken down, make shipment of rush orders for pump shafts or special tubing or anything else which the customer needs immediately, and purchase the material and supplies which are required for current operations.

At the same time the rearrangement of machinery in order to secure a more uniform flow of material is talked about forever and postponed forever because no one has the courage or initiative to go ahead with the work, even after plans have been agreed upon. The same is true of replacing a corroded water line, getting a foremen's organization under way, overhauling an old turbine in the power plant, revising shop regulations and building a new floor in the storage warehouse. All these matters need attention. Some of them, like the corroded water line or the uncertain turbine, may cause complete breakdown at any moment, but they are put off in favor of those things which "just have to be taken care of before you go home tonight."

Starting an apprentice training program is one of those things which are put off even by manufacturers who firmly believe in the system and who feel that they cannot evade the responsibility of training young men in their plants for industry.

"Yes, we have completed plans to train apprentices in this plant. We mean to get started, but, somehow, we don't seem to get under way. One of these days we shall surprise you and ourselves and hire apprentices."

How often you have heard that!

Two years ago this was the story:

"Oh, yes, we're all set with apprenticeship. But gosh, we can't start now. We've too much work on hand; we're running around like crazy; nobody has time to think. We're down here nights and Saturdays and Sundays. The mo-

ment things loosen up a bit we'll start, but it can't be done now. All we can do now is get work out."

And now listen to the tale:

"Yes, but this is not the right time. Everybody is depressed, there is no life in the place. Apprenticeship calls for energy and enthusiasm and there is none around. Nobody is in the mood; we would get only half-hearted cooperation. Besides, there is no work coming in and our people are on reduced hours and they would resent a flock of apprentices coming in to take more work away from them."

Which is actually the better time for installing apprentice training, a rush period or a slack period? One hesitates to answer this question. Say that rush times are better, and nobody will ever try to get started in slack times; if the decision is made in favor of dull times, no one will get started in the busy seasons. As a matter of fact, any time is a good time for the installation of apprentice training. Countless successful apprenticeship programs have been set up both in busy and in dull seasons. However, if a careful comparison be made it must undoubtedly be admitted that the slack times have a certain advantage.

Dull Period Best Time to Start

In times of depression, for one thing, officials, department heads and foremen have time to give to the subject the thought and attention which it requires. When the shop is rushed, all are kept busy moving orders through the plant and there is no time left for anything else; even the maintenance of machinery and equipment unfortunately gets scant attention and the individual problems of the workmen are hardly thought about in the press of the urgent business. During periods of depression there is time to relax, time for thought and time for discussion, which is just exactly what the installation of apprentice training requires.

When it has been decided to go ahead with apprenticeship, the management adopts a general plan which has been approved by a local or national manufacturers' association, or developed in cooperation with State officials or vocational educators.

The next move of the management is to submit the general plan to the department heads and foremen. They will be asked to think it all over for a sufficient length of time to prepare what suggestions they may wish to make, based on the requirements of their own departments and operations and the knowledge which they may have of the habits and tendencies of mechanics and young men of the present time. Their suggestions will include work and pay schedules for the apprentice courses, administration, trades and programs, arrangements for school instruction, the utilization of facilities in the various departments and the part which they themselves may be able to take in the training enterprise. When all suggestions have been received either in writing or in the course of a meeting for discussion of the matter, they will have to be tabulated and discussed once more by all officials involved until agreements have been reached.

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THE unsought hereafter is paved with good intentions. Many managements have sincere intentions to start an apprentice training course, but never get around to it. In good times they are too busy, in hard times the expense seems unwarranted.

What is the right time to undertake apprenticeship training? Mr. Freund weighs many considerations and concludes that a period of depression is the most propitious time. Then management has

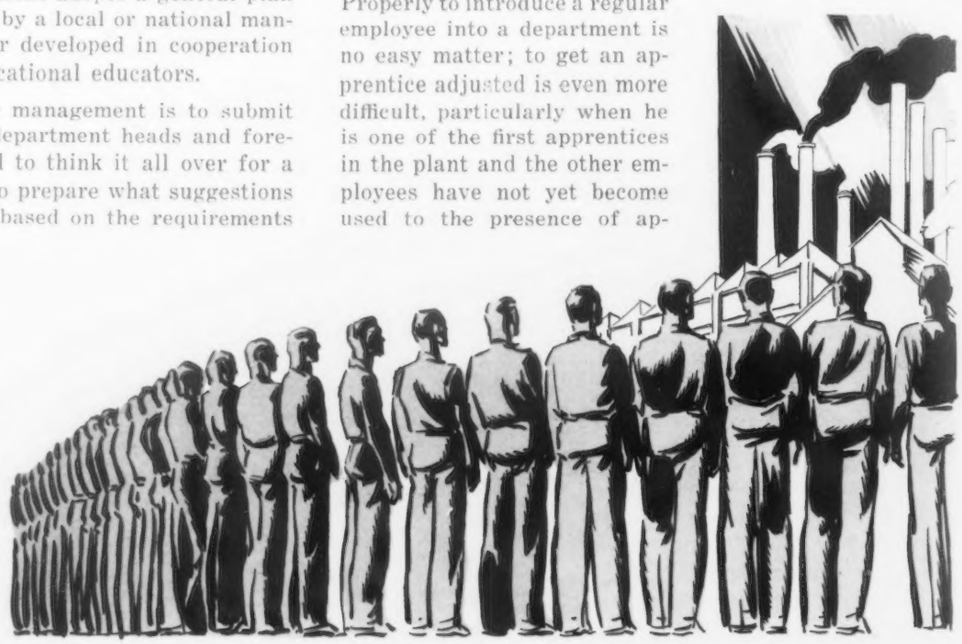
▼ ▼ ▼

Getting a Plan Launched

Thereupon a committee builds up a formal plan for the system based as nearly as possible upon the agreements resulting from the discussions, and this formal plan will have to be submitted once or several times to the entire group of officials for further correction and adjustment until all are satisfied with it.

When the plan has been worked out and approved, the first apprentices are engaged and once more the foremen and department heads will be very busy getting the boys started.

Properly to introduce a regular employee into a department is no easy matter; to get an apprentice adjusted is even more difficult, particularly when he is one of the first apprentices in the plant and the other employees have not yet become used to the presence of ap-



sufficient time — and much time and patience are required — to work out a satisfactory plan and properly introduce apprentices into the departments to which they are assigned.

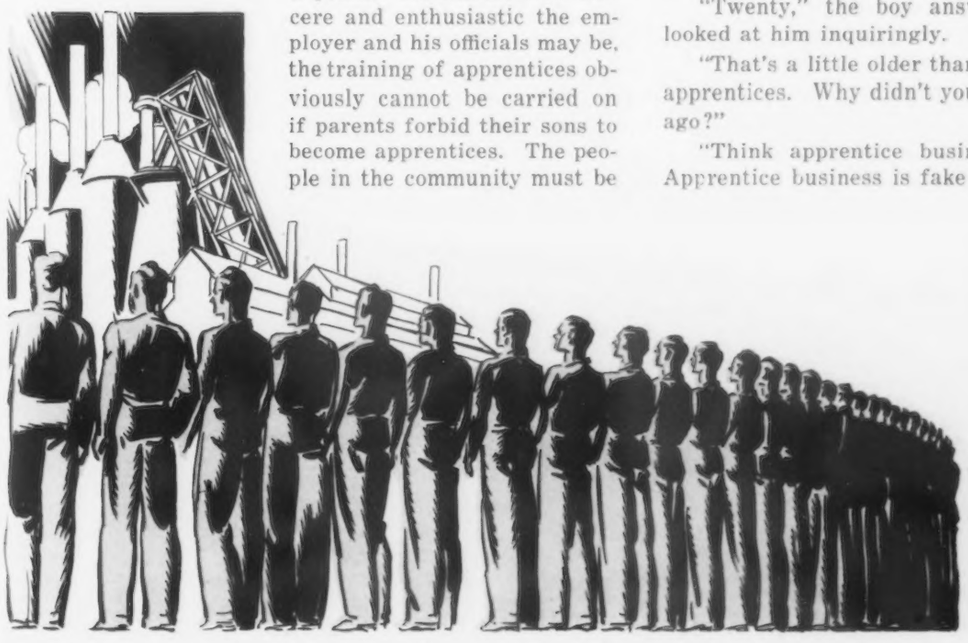
Undertaking apprentice training during a depression will win the support of the public and will insure a higher type of candidate. It is unnecessary, and in fact inadvisable, to engage a large number of apprentices when the training program is introduced.

prentices. Friction and misunderstanding are likely to arise, especially from the requirement of apprenticeship that boys be changed from one job or operation to another at regular intervals. Foremen and officials will need to investigate carefully every problem and difficulty that may arise and solve each one after due thought and consideration.

Plenty of Time Needed

All this requires time and a lot of time. For this reason a period of depression is preferable for the installation of apprentice training programs. During periods of depression foremen and department heads are not rushed, they can take a half day or a day off at intervals to devote to the apprenticeship problem and they can assume in the matter that leisurely attitude which is most conducive to mature conclusions.

The public also enters into this problem of instituting apprentice training in a plant. No matter how sincere and enthusiastic the employer and his officials may be, the training of apprentices obviously cannot be carried on if parents forbid their sons to become apprentices. The people in the community must be won over and this is no easy task, as the great public, the great common people, is rather suspicious and cynical regarding manufacturers and large employers and frequently ascribes hidden and vicious motives to the manufacturer's actions rather than accept the obvious motive. The best time to overcome this attitude is during business depressions.



This is, perhaps, best explained by an incident which occurred in Chicago in the slack period of 1927. A prominent manufacturer decided to undertake the training of apprentices and the announcement had been made that he was looking for boys to become apprentices.

Convincing the Skeptical

One morning a man of 45 walked into the employment office. He was accompanied by a boy, clearly his son. There was nothing unusual about the lad, he was no different from thousands of boys in the high schools of Chicago. However, the appearance and manner of the man were singular. He was roughly dressed, more roughly than was necessary, as if he had made a determined effort to have his clothes appear so. He was uncomfortable and ill at ease and bore an attitude of latent belligerence. Scowling and silent, he sat down to wait and the boy sat beside him.

The apprentice director was summoned and approached the visitors.

"Good morning," he said pleasantly.

The man nodded sullenly.

"What can we do for you?" the apprentice director continued, somewhat startled.

"I want that my boy be apprentice."

"Yes, but in which trade, in what line of work?"

"What he wants; I don't know. I want that he learn business and get a good job. I don't want that he bums around like me."

"That's fine, perhaps we can give him an apprentice job. How old is he?"

"Twenty," the boy answered when the father looked at him inquiringly.

"That's a little older than we usually like to start apprentices. Why didn't you bring him in two years ago?"

"Think apprentice business all a fake before. Apprentice business is fake in many places. Lot of work in factory, need men to work, can't get men cheap, get boys to work cheap; call 'm apprentices. All fake, big talk about learning trade. Big bosses always cheat, always find way to get more rich and poor fellow like me always get more poor. All crooked, everything from big bosses all crooked."

"Then why do you bring the boy here,

why do you want him to be an apprentice if you don't like the big shops and the big bosses?"

The shadow of a grin passed over the man's face.

"All right here, all right this factory," he replied. "Here apprentice learns business. Don't look for cheap labor here. Lot of men looking for job now, will work cheap. You want boy for learning trade. Everything here all right."

"So you think that we can't possibly want boys for anything besides actual training when we start this thing in a bad year?"

"That's right."

"Well, your boy had better go and get some recommendations and perhaps we can make him an apprentice."

Another shade of a smile startled the man's face into contours to which it was not accustomed.

This man, who was apparently out of sympathy with the present order of things in the industrial world and made it a principle that the manufacturer must almost of necessity seek to be unfair in his dealings with the public, was so much impressed by the willingness of an employer to start an apprenticeship when he clearly did not need help, that he was willing to entrust his own son to the apprenticeship process.

Of course, few parents of apprentices will be such extreme types, but if men of this type can be won over in a period of depression, then all parents can be won over.

Higher Type of Candidates Available

Another advantage of starting apprenticeship in times of depression is that there are more unemployed and accordingly there is a greater likelihood of finding high-grade candidates for apprentice training.

Of course, superior apprentices are always desirable, but to attempt to get an apprenticeship program under way with any but boys of very high caliber will be fatal. At the start the apprentice-training system will be very much on trial. The mechanics in the plant, the foremen, superintendents, the very officials who are most enthusiastic about apprentice training will be anxious to see how it works. Many, perhaps the majority, will take a neutral attitude in the matter, they will neither help nor hinder; if the undertaking is a success, very fine; if it fails, let it fail.

During this trying period nothing will help as much as high-grade apprentices with enough natural ability and interest in their work to attract the favorable attention of the men in the shop and enough tact and cheerfulness not to antagonize anyone.

On the other hand, nothing will do so much harm as stupid, lazy, irregular and irritating apprentices; human nature is perverse and the system rather than the boys will be blamed, apprenticeship will be thrown out and it will be many years before another attempt can be made.

It is needless to point out that only in times of depression will there be such a choice of applicants available that high-grade apprentices may easily be selected. In prosperous times young men of this type are not ordinarily out of work. There are exceptions in the case of young men who deliberately set out to find employment as apprentices, but these will usually attempt to find work in plants in which apprentice training is a long established institution and not an innovation.

Should Hire Apprentices Gradually

The most frequent objection to starting apprentice training in a period of depression, and one which seems reasonable enough at first sight, is that during such periods men are laid off or the hours of work are reduced and that it is unfair to introduce large numbers of apprentices into the organization, thereby increasing the number among whom the work in the shop must be divided.

The argument assumes that a considerable number of apprentices are engaged at the start of the program. To do so would be a serious mistake. In the first place, if a large number of apprentices are engaged at once, they will all graduate at once some years later and the shop may not be able to take care of them. They should be hired gradually, so that they will complete their training at equal intervals afterward.

Again, the personal difficulties of apprentices will be in proportion to their number. When the apprentice organization is just getting under way, the adjustment of the training schedules to the work in the plant, the ironing out of the difficulties in administration and the determination of policies as the need for them arises will present many problems. If a great number of personal apprentice difficulties are added to those involved in starting the enterprise, the combined burden will be greater than the apprentice official can take proper care of.

The way out is to start with a very few apprentices and thus keep the personal problems at a minimum while the administration is made to operate smoothly. When administration becomes partly automatic, the number of apprentices may be increased, as it will then be possible to pay attention to their personal problems.

A shop organization will not resent the introduction of one or two apprentices in times of depression, if the reason for their presence is carefully explained. This has been demonstrated by experience.

Training Not Costly

Finally, it is often contended that the expenses of apprentice training prohibits the undertaking of the work in slack times. The argument would be valid if the training of apprentices were costly which it is not, although this fact is too often taken for granted.

Employers who have successfully trained apprentices are agreed that apprentice training pays for itself as it goes along and there is no direct expense connected with starting apprentice training except the printing of forms and the salary of a director or supervisor, if one is employed, and these items are easily absorbed later on.

Photo by Colorado Fuel & Iron Co.

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THE VITALITY OF STEEL

IN this portrait study of two steel workers gazing upon the fiery steel furnace one senses the immensity of the struggle that man has undergone to wrest from the earth its store of iron ore and to convert it into the sinews of steel that give modern life its power, its strength and its unceasing vitality.

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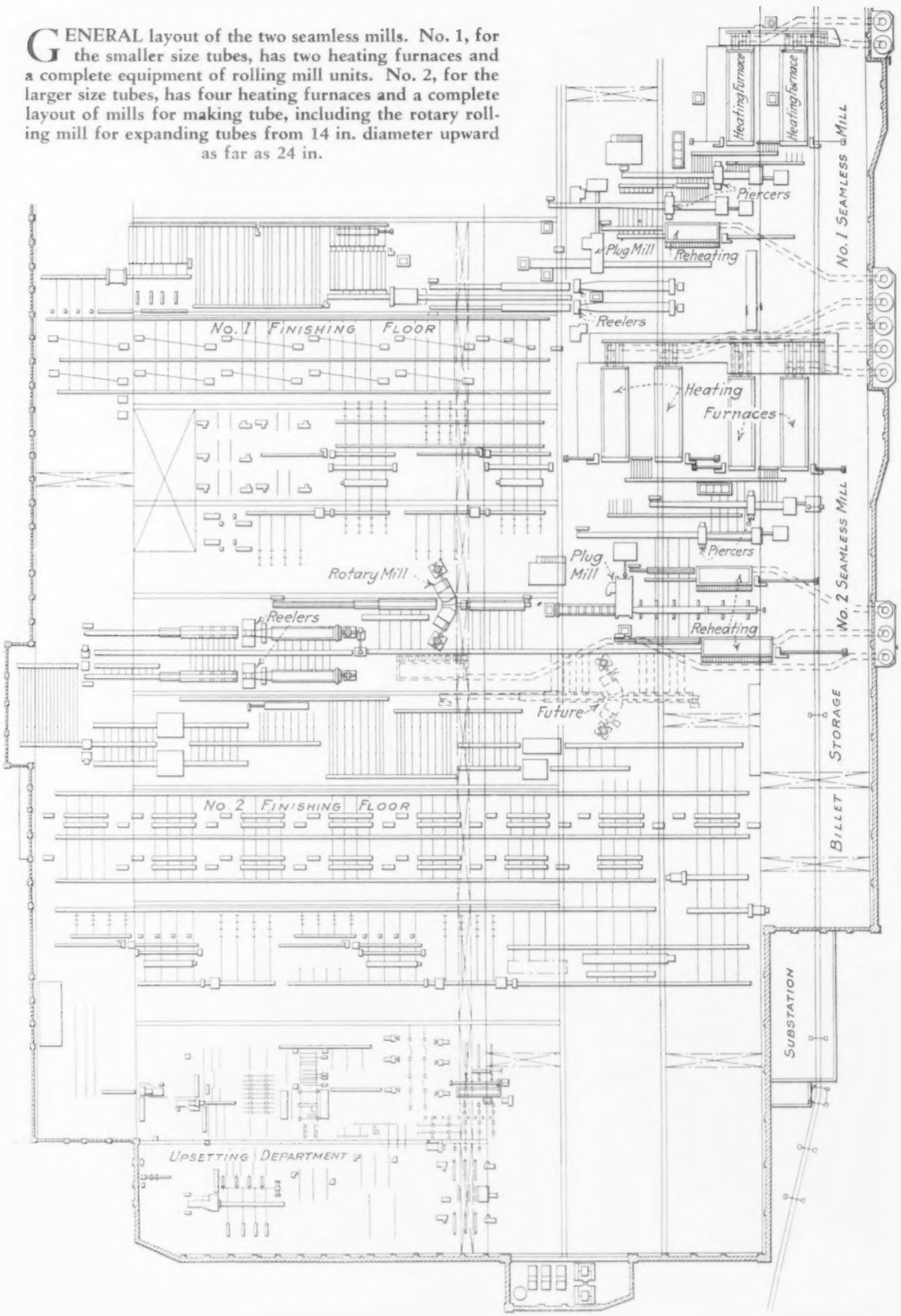
GENERAL layout of the two seamless mills. No. 1, for the smaller size tubes, has two heating furnaces and a complete equipment of rolling mill units. No. 2, for the larger size tubes, has four heating furnaces and a complete layout of mills for making tube, including the rotary rolling mill for expanding tubes from 14 in. diameter upward as far as 24 in.



SEAMLESS TUBE MILLS AT McKEESPORT

By SIDNEY G. KOON
Associate editor, The Iron Age, New York

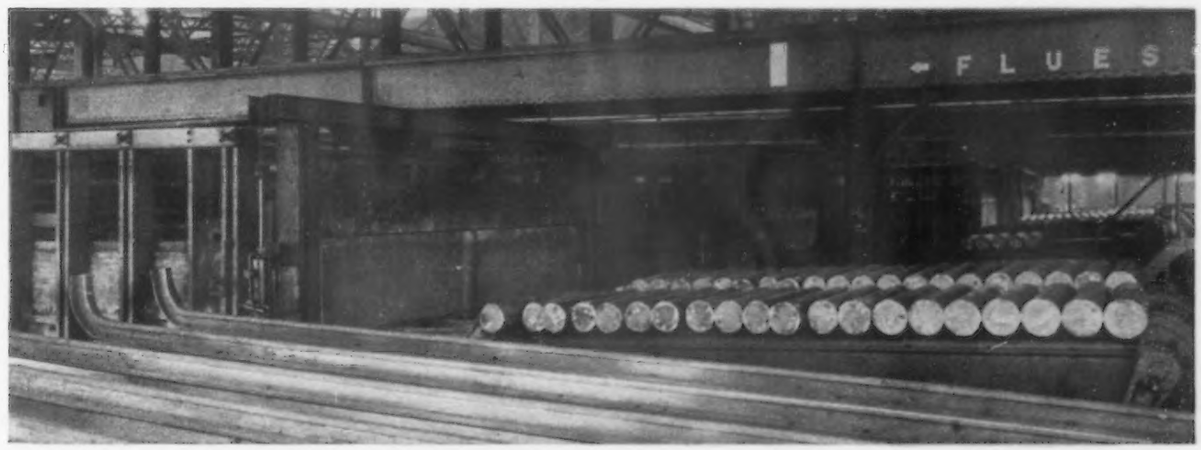
COMBINED annual capacity for 250,000 tons of pipe is comprised in the two seamless tube mills here described. Each is a complete unit in itself, but as the one makes the smaller size pipe and the other the larger there is practically no over-lapping in functions. Flexibility in handling pipe in various stages of manufacture is a feature in the layout.

TWO new seamless tube mills, covering a range of pipe from 3½ to 24 in. outside diameter, have been installed and put into operation in the National works of the National Tube Co. at McKeesport, Pa. No. 1 mill produces pipe from 3½ in. to 8⅝ in., while No. 2 mill makes pipe from 8⅝ in. to 24 in.

Much of the equipment in the two units is similar, except that in the main the individual pieces of equipment in No. 2 mill are heavier, corresponding with the larger product there made. As to the furnaces, however, they are almost identical, there being two furnaces feeding the smaller mill and four for the larger. But the roofs on the two No. 1 mill furnaces are of a different type from those on the four furnaces for No. 2 mill.

Round bars, already center punched and of the length and diameter required to make the size of pipe under order, are delivered from the steel works to the billet storage bay serving both of these mills. These bars are placed upon the feeding tables for the furnaces as needed, and roll by gravity from the entrance to the point of exit. Over the first half of the passage through the 80-ft. furnace, the bars roll over skids. Because of the much higher temperature near the lower or discharging end, no skids have been introduced here and the bars roll over the furnace bottom.

Discharged from the furnace by a motor-driven push bar, the heated billet passes on a conveyor to the first of two piercing mills, where it is opened up over a mandrel through the action of Mannesmann crossed rolls. The pierced blank is then run through the second piercer, which much enlarges the internal hole, and at the same time brings the wall thickness down nearer what it finally will be. A reheating furnace is installed (two furnaces, in the case of No. 2 mill) just after the second piercer. The tables taking hot steel from the reheating furnaces have individual motor drive on each roller.



Charging platform for the round bars going into the heating furnaces. The far end of each bar shown has been center-punched about 1-in. deep, as that end reaches the piercer first.

It is customary, however, for the pierced billet to by-pass these reheating furnaces and go directly to the plug mill. Here it is brought still closer to the final diameter and wall thickness, through the action of grooved rolls, with a mandrel on the inside of the pipe.

From the plug mill the pipe passes to the reelers, two in number on each mill, as the hourly capacity of an individual reeler is about half that of the equipment which has gone before. Leaving the reelers, which discharge it over tables feeding a conveyor midway between the two reelers, the pipe is practically its finished size.

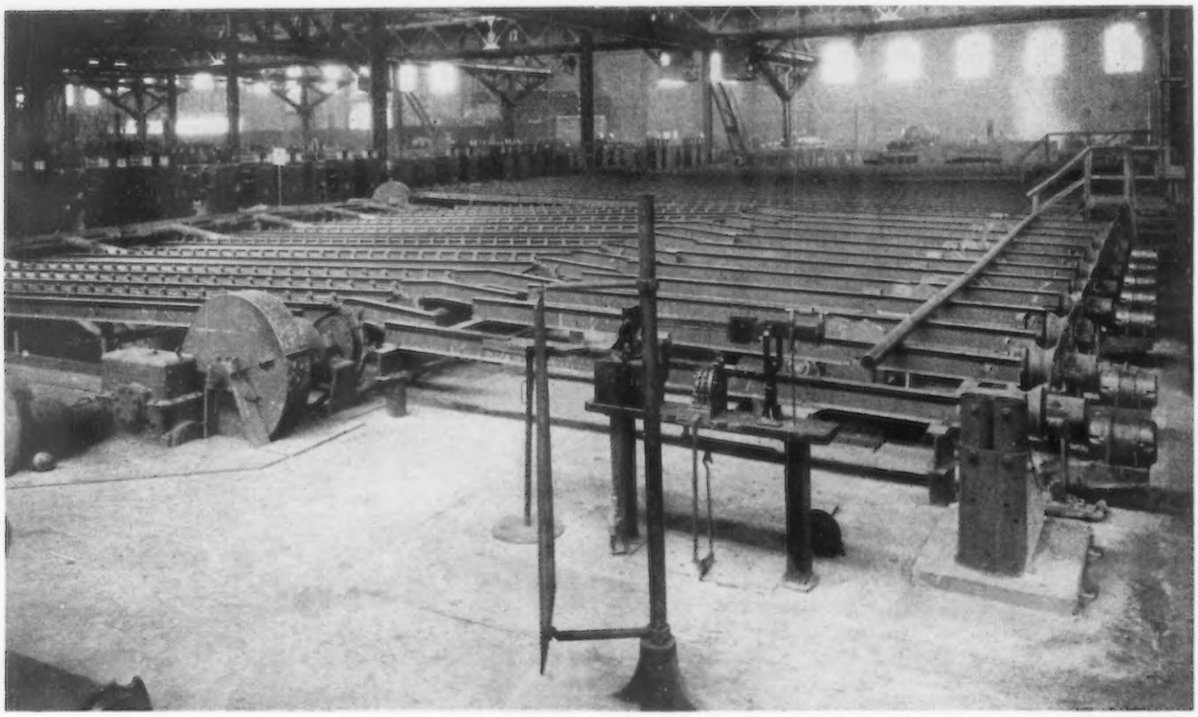
From this point the two mills differ. No. 1 mill has a reducing mill of five stands of rolls, from which the tube passes to the cooling tables. No. 2 mill has two size-roll machines, and two cross-roll machines, to get the exact diameter required, the exact roundness, and the straight character demanded of the product. One type of straightener is used for all pipe up to 13-in. outside diameter. Above this size, a different machine with three stands of rolls is employed. Air at 300 lb. pressure is used to clear the inside surface of scale.

From this point on, the material is allowed to cool on the cooling bed. The second sizing operation takes place after the pipe has become cool enough so that the effect of temperature will not in any way obscure the dimension. All motors driving all parts of the heavy equipment are served with filtered air, keeping them cool and avoiding introduction of dust.

One of the main features of this mill which differentiates it from many others, both in the arrangements for the hot process and in those for finishing cold, lies in the way the conveyor runs are arranged to handle the product. Practically never is it necessary to pick up the pipe by means of a crane until this pipe, along with a number of its fellows, has reached the shipping cradle and must be put into an outgoing car.

Flexible Conveyors Avoid Use of Cranes

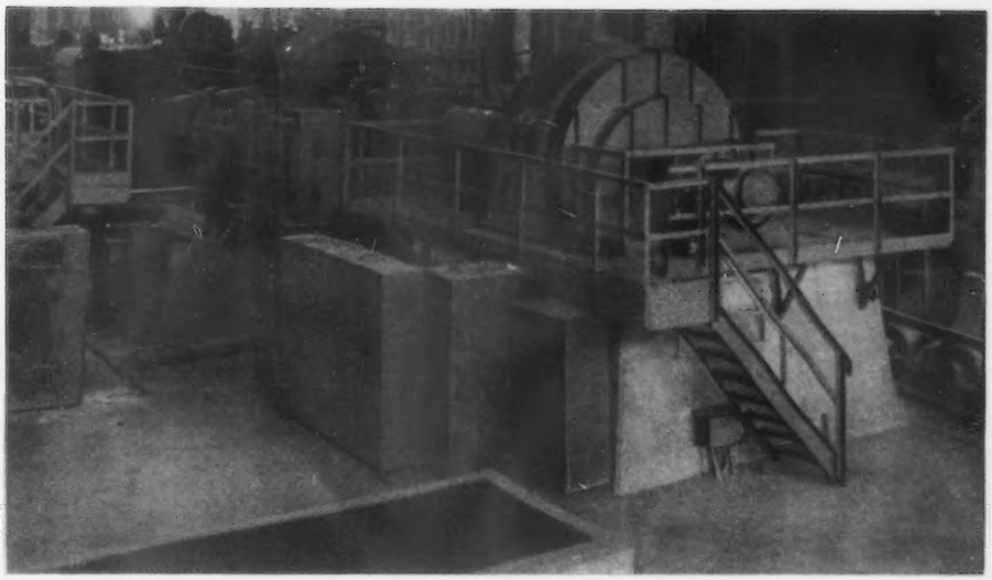
CONVEYORS with live rollers, or with alternate live and idler rollers, cross the shop between operating units or processes in such a way that the feed of the material may be made most flexible. This method of handling pipe was developed by the National Tube Co. about 15 years ago, and has proved most advantageous.



Cooling tables for No. 1 seamless mill. Scale beam in foreground weighs each length of pipe upon the carriers immediately at left of pipe in right foreground. All transformers and switches throughout the mill are grouped under crane runways, as shown in left background.

This characteristic of flexibility is particularly true when we come to the finishing equipment which, in the case of No. 1 mill, includes five pairs of cutting-off machines, with a similar number of threading machines. A long conveyor ahead of the cutting-off machines, and fed from the table following the last straightener, permits delivering a piece of pipe to any one of the five pairs of cutting-off machines. The pipe, after having its ends faced and chamfered, is then kicked off on to another conveyor parallel with the one just mentioned, and between the line of cutting-off machines and the line of threading machines.

Here again it is possible for pipe from any pair of cutting-off machines to be fed to any pair of threading machines, regardless of location and without confusion or piling up of surplus stock. There is



PIERCING mill, in center, is driven by motor at right. Something of the angle of the driving spindle may be noted between gear box and mill.

adequate room on the tables to take care of the momentary surplus arising from faster operation of one set of machines, or some delay on another. Thus these lines of roller conveyors make it possible to operate at the highest average efficiency, without delays in waiting for a crane, and without the bending, denting or other damage which cranes sometimes give to thin-walled pipe.

All of this pipe is tested at high hydraulic pressure before shipment, and is oiled or treated to a protective coat to protect it in transit to its destination.

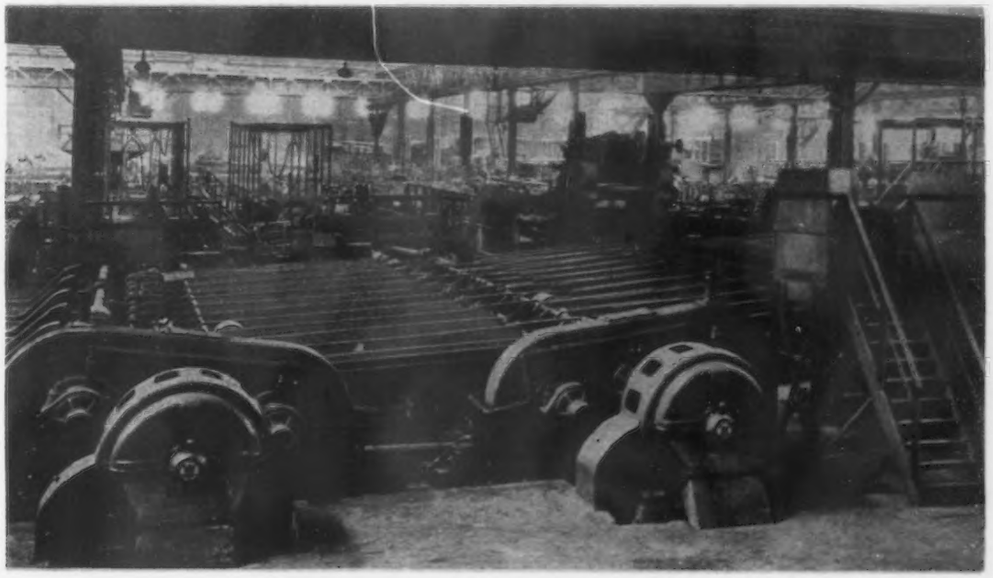
Unusual Type of Expander

One feature which the large No. 2 mill has, and which is of rather unusual design, consists in what is known in the plant as the "rotary rolling mill." This piece of equipment, which is decidedly massive, consists of two large disks and the operating equipment to keep them going, and a plug on a mandrel. All of the largest size pipe is made upon this machine, its range of expansion being from 14-in. pipe to 24-in., outside diameter, and, of course, anything in between.

Particulars of Finishing Equipment

DIFFERENT sizes of pipe may be fed readily to the cutting-off machines through a device using cams as the basis for a slight raising or lowering of the feed table. This makes possible a quick change from one size of pipe to another, in place of the delays which would be entailed by a change in the feed-table elements. Another device in use here, which is operated automatically from the cut-off machine, itself elevates the pipe off the feed rollers while it is being rotated in the cutting-off machine. This prevents scratching it from rotating over the surface of the feed rollers.

Threading machines used here, and developed by



TWO-HIGH or plug mill appears near right of picture. The two motors in foreground drive, through reduction gears, two reelers at far side of transfer table. Blanks from the plug mill are fed to the reelers alternately.

Plug mill and conveyor on No. 2 seamless mill. This roller conveyor at left is one of several traversing the entire width of building from north to south, and permitting great flexibility in distribution of partly finished tubes.

the National Tube Co., have special cam chucks with holders connected to a brake band. Operated from the front of the machine, these grip and rotate the pipe while it is being cut. The threading carriage with the die is moved by an air cylinder. The threading carriage advances, while the pipe rotates, but does not advance.

Dies on the threading machines are made in halves, with a wedge type of adjustment to draw them up tightly together. This arrangement is said to give excellent control and accuracy. The wedges are driven down by air cylinders, and the two halves of the die thus set tightly in contact.

Leaving the threading machines, the threaded pipe lengths are kicked off the tables on to a third long roller conveyor, parallel to the two already mentioned. This carries them to the hydrostatic test machines, with the same flexibility in movement as before. Every pipe is given this high-pressure water test. There are two machines for screwing on the couplings, prior to putting the pipe through the test. Two testing machines for pipe up to 16 in. outside diameter are installed, while the third takes pipe up to a maximum of 26 in. diameter and 45 ft. long.

Every pipe, after having been completed, is both weighed and measured on the way to the shipping point. The weight and measure are painted upon the pipe. It is easy, therefore, to determine at once

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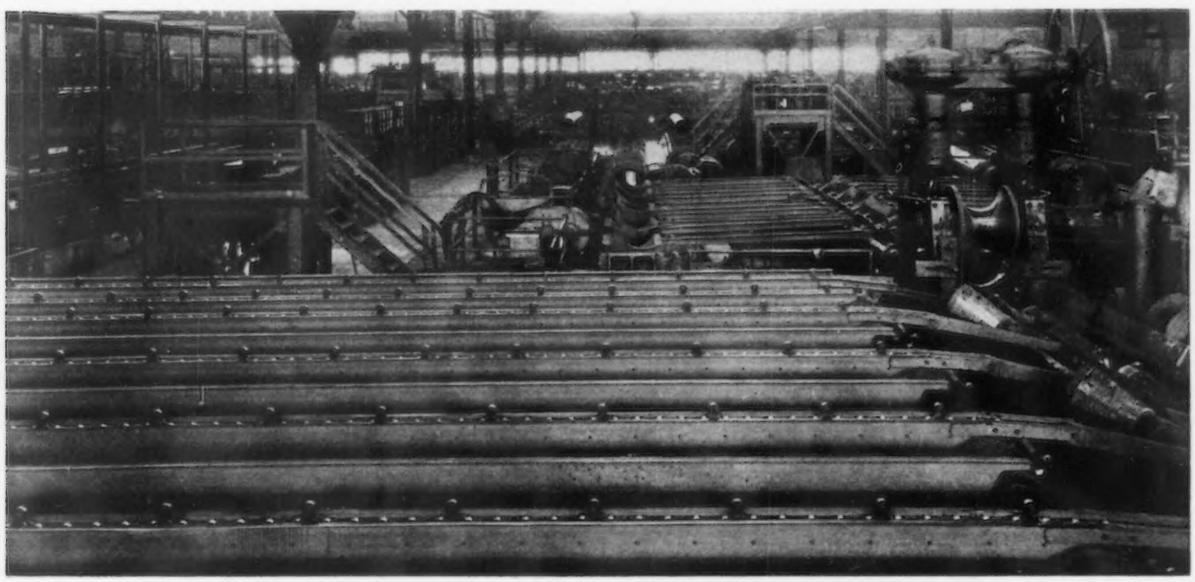

Transfer table and sizing machine for No. 2 seamless mill, with cross-roll tables just beyond the sizing machine.

COOPERATIVE TECHNICAL RESEARCH IN STEEL INDUSTRY

By DR. F. N. SPELLER

Director, Department of Metallurgy and Research, National Tube Co., Pittsburgh

ONE objective of this paper is to bring up for discussion the question of how the present methods of carrying on cooperative research can be improved and coordinated in the American iron and steel industry. It is suggested that a plan be worked out whereby the industry as a whole will take a responsible part in supervising and coordinating work on non-competitive technical problems. A tentative plan of organization for this purpose is offered for consideration.

The term "industrial research" is now being used (and quite properly) to include all kinds of investigations that in any way benefit producing organizations and the consumers of their product. It includes investigations of marketing conditions, distribution, new sales fields, welfare of employees, consumers' problems, as well as the study of fundamental scientific and engineering problems on which the industry is founded. With respect to inter-commodity competition, it serves to open new fields for old products, to develop new products that tend to open up wider markets, and to guard against the encroachment of competitive products. In all cases the study of market and economic conditions should go hand in hand with technical research, except perhaps in the scientific study of fundamentals.

It is possible to spend too much time on problems having to do with lowering costs and increasing production and not enough on developing a wider field of consumption for the product. So marketing and technical research should work in close contact with one another. The present discussion, however, deals particularly with technical research leading to better understanding of materials and processes.

Research should aim at unearthing all the facts of the subject under investigation. The term is sometimes overworked and applied to trade propaganda which deals mainly with one side of a question. Such improper use of a term tends to bring it into disrepute and should be discouraged by the industry, for we have no other term that covers the objective so well; that is, the search for facts and principles.

Problems Are Competitive and Non-Competitive

The technical problems of an industry, such as ours, may be divided into those that are competitive, such as the developing of special improvements in

processes and products, for instance, new rust-resisting steels; and those that are non-competitive, which include investigations of the principles of the processes employed, for instance, the study of the chemistry of steel making. The latter tend to fortify the position of the industry and to broaden the field and exert a stimulating and beneficial effect upon the industry as a whole.

Pure and applied scientific work may be divided in the same way, although as pure science research is usually non-commercial, it includes mainly non-competitive problems. Obviously non-competitive problems can usually be solved most economically by cooperative research, which brings us to the main subject of this paper.

Investigative work of all kinds has increased to such an extent in recent years that it becomes a matter of considerable importance to study the economics of operation. Moreover, experienced research men are none too plentiful. The profits from this work have been so large in many cases that the practical advantages of cooperative effort may have been overlooked.

[Research work in Germany and Great Britain is described by the author at this point.]

American Industrial Research

The industrial research associate plans of the Bureau of Standards and the Bureau of Mines are the nearest approach we have in this country to the foreign systems by which public funds are expended on problems that are in a large part of general benefit to the public; then we have endowed industrial research institutions, such as the Mellon and Battelle Institutes, and the Massachusetts Institute of Technology, that are well equipped for a certain amount of metallurgical work for the use of individual concerns or trade associations desiring to enter into research on any particular problem.

Results of work done through these agencies become the property of the sponsor or the public at the option of the former. Such institutions usually take care of the overhead expense so that individual problems may be worked out under these auspices at comparatively small cost to the client. The Mellon Institute of Industrial Research in Pittsburgh is recognized as the pioneer in this system of operation.

Cooperative research of general interest to the iron and steel industry in America is at present sponsored by various institutions including a number of the leading technical societies and governmental bureaus. This division of control has advantages and disadvantages. The group that initiates a piece of work usually includes, or can bring together, those most interested, but there is of course a lack of general coordination, some duplication of effort, and occasionally differences of opinion on minor matters that tend to obscure the main objective. However, it is well known that some very useful work has been carried out under these auspices.

PRESENT methods of carrying on cooperative research in the American iron and steel industry can be improved and coordinated. A tentative plan of organization for this purpose is offered in this article, which is an abstract of a paper before the May meeting of the American Iron and Steel Institute. The suggestion is included that, in working out such a plan, the whole industry shall take a responsible part.

The United States Bureau of Mines for nearly five years has provided laboratory facilities and also men, in cooperation with Carnegie Institute of Technology and a number of leading metallurgical concerns, for the study of the physical chemistry of steel making, refractories, abnormality in steel and other problems of fundamental value, especially to the iron and steel industry. This is one of the best and most recent examples of cooperative metallurgical research in this country and has attracted world-wide attention.

[A detailed summary of this work is given at this point.]

Whatever the final economic result may be, our knowledge of the reactions in the open-hearth bath and the fundamentals of steel making has been considerably advanced by this work. Much remains to be done on the practical application of these principles to the improvement of the open-hearth and Bessemer processes and on the study of the influence of non-metallic constituents on the physical properties, weldability, corrosion, and defects of steel.

The original five-year program will be completed this year. The metallurgical advisory board hopes to continue the work for another period of three years and trusts that it will be possible to retain the present organization for this purpose. The new program includes further study of: The refining of steel in the electric, open-hearth and Bessemer processes, strong deoxidizers, elimination of non-metallic matter, gases in steel, quicker methods of determining inclusions, and the influence of these inclusions on the physical properties of the finished steel, and allied problems. The plant work will be carried on at convenient locations, and bulletins issued from time to time so that those interested will be promptly informed of results.

Present Accomplishments

The present accomplishments resulting from work done on this problem are, briefly, (1) the determination of solubility of iron oxide in pure iron and the correlation of the iron oxide content of open-hearth steel with this solubility curve, including the development of the aluminum method for determin-

Formation of a central research board is recommended, under the auspices of an association of iron and steel manufacturers, including advisory members representing cooperating interests. The technical problems involved are divided into two classes: competitive and non-competitive.

In the discussion of the paper two leading metallurgists for the most part supported the recommendations of the author.

ing in a relatively short time the iron oxide in steel, and the determination of the relation between carbon and FeO contents in liquid steel and slag of various composition; (2) completion of the entire program on formation and identification of non-metallic inclusions whose base is FeO, and work on deoxidation with manganese-silicon alloys; (3) the development of the electrolytic method for determining non-metallic inclusions in steel; (4) the determination of melting points and viscosities in various slag systems, these forming a solid foundation for future work on deoxidation and slag manipulation in the open-hearth furnace; and (5) the application of the above to open-hearth work in the production of steel of greater cleanliness than has been obtained by present-day steel-making practice. Practical tests on acid and basic open-hearth heats already show on the average a distinct improvement in quality and rejections at three plants where these principles have been put into practice.

The Bureau of Mines, feeling that its function as a Government institution is to initiate and assist in investigations of this kind until the results justify the interested industry in taking them over, has decided to utilize its resources on other problems after Jan. 1, 1932. The advisory board trusts that a plan will be found whereby this work may be continued for a further three-year period. It would seem that this is an opportunity for the industry as a whole to take over this going organization with the cooperation of the Carnegie Institute of Technology and others who may be interested.

(Since this was written, the board has recommended, in consideration of present conditions, that this work be concentrated next year on plant application of the principles already worked out. The influence of non-metallic matter on the physical properties of steel will also be determined. Inclusions are not necessarily harmful in all cases. Opinions should be checked by facts.

The funds already subscribed will carry this work through until the end of this year. If the same amount is contributed by the industries for the following year, the work can be continued on this basis with Dr. Herty and some of the present organization.)

Cooperative research often helps to retain the use of steel in a field which otherwise might be occupied by some more durable but relatively more expensive material, and at the same time helps to develop trained technical men for the industry. Technical data obtained cooperatively and indorsed by an industry working together sometimes carry more weight than that secured through the efforts of one concern, and can be obtained at relatively lower cost to each of the participating interests.

Most cooperative work naturally centers around a committee of those best able to assist in the work, who should be responsible for planning and supervising the work in a general way. But unless some one individual is responsible for keeping things moving, committee work is apt to lag, especially if the members of the committee have many other important duties. Rarely can a volunteer committee carry on an important investigation promptly and efficiently without a paid associate whose main business is to follow up the details of the work as planned by the group. By this means the time of the advisory committee is saved and the work can often be carried out in shorter time and at lower cost than when directed solely by voluntary effort. It is usually difficult, however, to estimate the actual cost of cooperative research, through lack of sufficient records.

Then there is, of course, always the fundamental problem of financing projects of this kind, but surely there is no reason in this country to anticipate difficulty in financing a well-planned, useful piece of research work of benefit to the industry at large. All of the preceding leads us to the question, What can and should be done by the American steel industry as a whole toward planning, coordinating, and financing cooperative investigations?

Conclusions and Recommendations

It will be seen that a large amount of cooperative research work has already been done in this country under many agencies, working independently, such as educational institutions, Government bureaus and engineering societies. The valuable results already obtained in many cases, through the initiative exercised by these groups, lead us to feel that in the future similar work can be done more efficiently and more economically with proper coordination. It would seem therefore that the time is near when non-competitive problems should be sponsored by this industry as a whole, with the full cooperation of those who are able to assist actively in such work. Coordination should result in better planning and greater economy of execution.

To this end, it is suggested that cooperative work in this industry be centered in a research board, under the auspices of an association of iron and steel manufacturers, including advisory members representing cooperating interests. The duties of this board would be:

(a) To investigate, approve, and assist in planning work on non-competitive technical problems submitted for considera-

tion by member companies or responsible associations of engineers or consumers.

(b) To budget the cost of each piece of work and arrange for financing after the problem has been approved as being one of interest and value to the industry as a whole.

(c) To decide on location and assignment of the work, at home and abroad.

(e) To establish means for publication and discussion of results. For this purpose an official means of publication might be desirable, with permanent facilities for abstracting and printing all technical literature and reports of general interest to the industry.

As there are many institutions in this country equipped for laboratory work, the location selected for any specific job would depend upon where the work could be done to the best advantage. Later on technical institutes for iron and steel problems might be established by the industry in important industrial centers.

As a first step in this direction, it has been suggested that the industry take over and put on a more permanent basis the cooperative metallurgical research work now being carried on in Pittsburgh.

Discussion by Dr. H. W. Gillett*

THE work of Dr. C. H. Herty, Jr., and his associates has had a wider scope, and has brought more definitely useful results, than were hoped for or dreamed of when the project was first discussed in the bureau. It became possible only when cooperative backing was afforded. The work has brought much needed information, in a usable form, to the steel industry, and has added to the prestige of every one of the cooperating agencies. Now that the work is in the stage of application to industry, it would be a pity if it were not carried along by the industry so as to get maximum returns from the investment already made.

Dr. Speller's paper is timely because of the immediate necessity for further financing of that particular project, now that the present officials of the Bureau of Mines have decided to cease cooperation on it. It is timely also because now is the logical time to raise the broader question of cooperative research in general.

The proposal for a permanent central research board therefore deserves close attention. Since we may reasonably judge the future by the past, it will be worth while to appraise the cooperative research projects that have been carried on under various auspices, as to the conditions of cooperation that led to notable success, moderate success, or failure, and to see whether the success would have been attained and the failures avoided by the scheme suggested. From such a survey, I come to the conclusion that failure, or incomplete success, comes more often from faulty conditions of cooperation than from faulty technology.

In setting up a cooperative problem, it is absolutely essential, as Dr. Speller rightly emphasizes, that it be a non-competitive problem for all those who back it. Some problems combine non-competitive and competitive features in almost inextricable fashion. For example, certain corrosion problems which Dr. Speller lists as suitable for joint attack, become tied up with the development of rust-resisting alloys, which he classes as unsuitable. In such a case, it takes a wise and broad-minded committee of really big men to steer an investigation that will advance the joint knowledge of fundamentals and avoid touching off the competitive dynamite.

Economics Not to Be Neglected

Even though the problem is a non-competitive one, it is possible to slip up in its selection, if economics are neglected. Every research worker and research committee should read, once a year, Dr. F. M. Becket's presidential address in 1926 to the Electrochemical Society, dealing with the need for cost estimation in advance of laboratory work so as to avoid wasted effort on what may be technically sound and ingenious, but economically impossible.

One feature of Dr. Speller's plan deserves special emphasis. It is always easier to be the coordinator than the coordinated. Such a central research board must scrupulously avoid giving the impression that it is setting itself up as the sole and supreme coordinator of all research on iron and steel, else it will inevitably alienate other groups.

Certainly the iron and steel industry might well utilize a research board that could cooperate with other research groups that have wider interests than those relating to any single industry. Such groups as the National Research Council and the Engineering Foundation can be of assistance, but the new board could probably go further along its own special lines than could the more far-flung organizations. Similarly, a central research board should itself cooperate with other more specialized groups.

The successful functioning of the suggested central board should be of real service in making possible more cooperative research effort on non-competitive problems, such as the "Physical Chemistry of Steel Making," the "Alloys of Iron Research," and the work of the "Joint Committee on High-Temperature Properties of Metals." Such problems are too big for any single firm, no matter how powerful, to handle alone. On such problems the cooperative method is the cheapest as well as the most effective.

Discussion by E. F. Kenney†

THE particular division of industrial research covered by Mr. Speller's interesting paper has been subdivided by him into two classes, namely, those which include problems that are competitive and those which are non-competitive. I take it that the competition referred to is between individual manufacturers in the same industry, and understand that the reason for this division is that the solution of

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†Metallurgical engineer, Bethlehem Steel Co., Bethlehem, Pa.

problems which are competitive would mean an advantage either in quality or price of a product. In this case the incentive is so material as to constitute a sufficient urge.

Where there is a possibility of this kind of commercial advantage, the adoption of cooperation removes this very strong incentive, and it is doubtful if even the admitted advantages of coordinated study by the industry would compensate for the loss of the stimulus of the "pocket nerve."

I am inclined to believe that the competitive field in the steel industry is wider than Mr. Speller indicates. The case cited by him as representative of the non-competitive class, namely, the study of the chemistry of steel making, may be quite competitive, as is evident from indications that the chemical control of steel making is sometimes the basis of patent applications.

Two Suitable Fields for Cooperation

There are two fields which seem to be most suitable for cooperative research. One is that of fundamental properties, melting points, heats of formation, etc. The other is the investigation of questions which are competitive, not within the steel industry but competitive between the steel industry and some other industry. In these cases we have the commercial incentive, but here the goal is not the advantage of an individual manufacturer but the advantage of an entire industry, and the cooperative effort has no countervailing feature. The character of the work and the type of personnel which are most efficient differ greatly.

It is quite practicable for the industry to cooperate in fundamental research, but my own feeling is that this is more properly the field for institutions of the type of our Bureau of Standards, the National Physical Laboratory or the Kaiser Wilhelm Institute. Applied research, which involves no problems which are likely to have a bearing on competitive features within the industry or problems which have a bearing on competition between the steel industry and any other industry, should undoubtedly be treated as a common interest and the subject of cooperative work. But all applied research which does involve problems that do have a bearing on competition within the industry should be the province of the individual manufacturer who will presumably be the beneficiary.

The steel industry has carried out comparatively little cooperative work in research. Undoubtedly there is a field within which much can be done for the general benefit of the industry, and Dr. Speller has made a most timely recommendation for a cooperative movement in behalf of our common interest.

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Metallurgical Applications of High-Frequency Oscillations

CERTAIN remarkable effects of high-frequency oscillations on metallurgical reactions have been reported by M. Fayollet (*Aciers Speciaux, Metaux et Alliages*, January, 1931). The work of G. Mahoux has shown that, if steel to be nitrided is inserted in a high-frequency circuit, the other conditions such as temperature, time, alloy composition, gas, etc., being maintained as usual, the depth of the nitrided layer is considerably augmented.

This seems to suggest that the application of high frequency would permit an equal penetration in a shorter exposure. This is not evident in the statement of Mahoux; in fact, the surface hardness indicated is equal to that produced in the ordinary manner. Actually the time to produce a layer of equal depth and hardness should be reduced to one-tenth the usual time. Mahoux's results were:

1.—A chrome-nickel-molybdenum steel of the composition C0.35, Ni3.0, Cr3.0, Mo1.0, Si0.25, Mn0.25, S0.04, and P0.04 per cent was nitrided in the form of a bar 19/32 in. in diameter for 9 hr. at 930 deg. F. in a current of ammonia. The mechanical properties were:

		After Nitriding	
	Before Nitriding	Ordinary	With High Frequency
Strength	190,000 lb. per sq. in.	..	..
Resilience at center	20 lb.	20 lb.	26 lb.
Surface hardness (Brinell-Vickers)	380	1033	1033
Penetration of Nitridation	..	0.0004 in.	0.014 in.

2.—An austenitic valve steel of the composition C0.31, Ni8.0, Cr19.8, Mo0.23, W4.0, Si0.25, Mn0.35, S0.015, and P0.01 was nitrided in the same manner for 10 hrs. Initially the steel had a strength of 114,000 lb. per sq. in. and a Brinell-Vickers hardness of 235. After nitriding in high frequency, the hardness became 1035 at the surface, 570 at the depth of 0.04 in., and 472 at the center. The magnetic susceptibility was greatly augmented.

Mahoux also tested the effect of high frequency on hot chromium-plated mild steel. A 19/32-in. rod was first electroplated with chromium and then was heated at 980 deg. in a high frequency field for 9 hr. After the test, metallographic examination showed that the chromium had penetrated the steel to a depth of 0.014 in. Without the high frequency, the chromium layer was detached from the steel with no penetration.

CONTINUOUS LOOP CONVEYOR

TWO papers were presented at a conveyor handling session of the American Society of Mechanical Engineers in Cleveland on April 15. One of these, "Synchronization of Production Control with Conveyor Equipment," prepared by E. M. Olin and W. E. Beattie of the Westinghouse Electric and Mfg. Co., Mansfield, Ohio, was published in abstract in THE IRON AGE of April 2, beginning on page 1094. The other paper, "Materials Handling for Mass Production at the General Electric Plant," read by H. C. Rundle, planning engineer of that company, is abstracted in succeeding paragraphs.

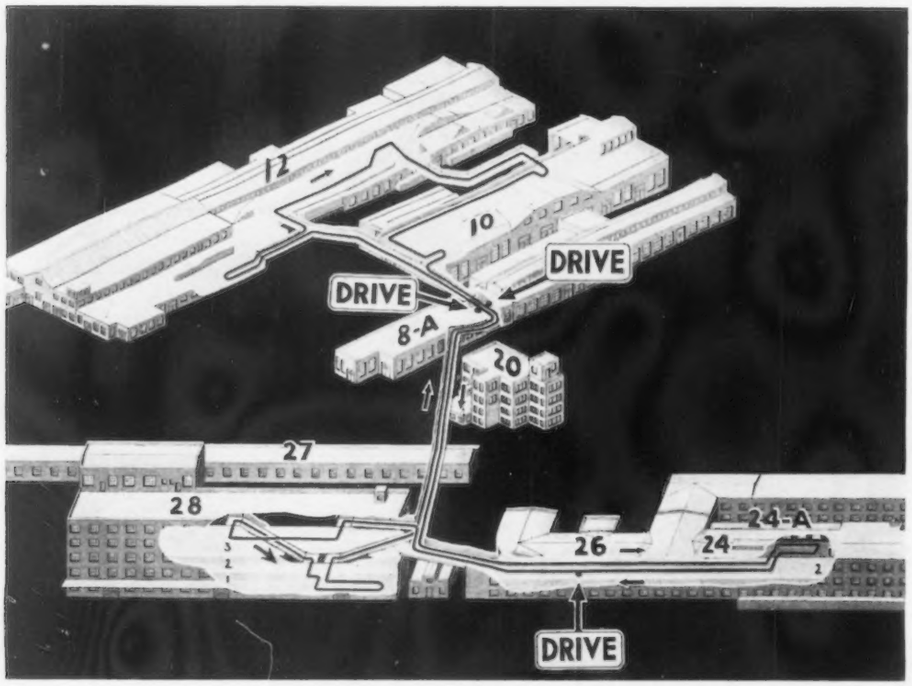
Both of these papers were accompanied by moving picture films showing conditions of operation. The General Electric film was presented with the "talkie" addition, describing what was going on and commenting upon what the reel showed. This gave a picture of conditions before the installation of the conveyor and then afterward, to show the great contrast.

This General Electric conveyor was installed by the Jervis B. Webb Co., Detroit, at a total cost for conveyor, housing for such parts as were out of doors, annunciators, celotex insulation, etc., of about $49,000, of which the conveyor, together with the flooring and sheet steel for the overhead bridges, was about $32,000. This involved a length of 3890 ft. in the complete loop and about 1000 ft. of overhead housing on bridges.

It was estimated, before this was put in, that the savings expected would pay for the installation in about a year. In practice, however, it was found that the savings were so great, both as to labor of transportation and as to reduced spoilage of material which formerly was hauled outside, that the entire installation cost was covered in about six months.

This long conveyor has three driving units spaced approximately one-quarter mile apart along the system. Each of these is supplied with a Reeves speed changer and acts against springs in such manner that the imposition of load upon the conveyor does not result in shock. Mr. Webb, in the discussion on the paper, expressed the opinion that this system of mounting is so well developed and gives such flexible operation that such a conveyor could be built of any length up to as much as 20 miles, and still operate without distress.

Limits of movement back and forth in the drive are from 4 to 6 in. This automatically responds to stress in any section and equalizes the load on the chain. The maximum load hanging from the chain



Intra-departmental materials-handling conveyor in the refrigerator department at Schenectady. This shows the path of the conveyor system through and over several different buildings, and indicates the locations of the three driving units.

PAYS FOR ITSELF IN SIX MONTHS

A CONVEYOR about three-quarters of a mile long in a closed loop, running through several buildings and in covered passage-ways between and over buildings, serves the refrigerator department of the General Electric Co. at Schenectady. The system is said to give such flexible operation that it could be extended to any length up to twenty miles without loss of efficiency.

at any one time is about 10 tons, distributed unevenly along the length.

Chain Is a Transportation Medium Only

No manufacturing is done upon materials while suspended from the chain. It is purely a means of transportation from department to department, or operation to operation. Inspectors at various points remove the parts, give them an inspection and hang them upon other chains leading to assembly lines. Materials are removed for other uses, either going into storage or into processing or assembly, as occasion may require.

Before this installation, material was handled by tractor-and-trailer trains, lift trucks, and gas and electric trucks. The new system has eliminated congestion, retracing of material routes, delays in schedule, spoilage of material, and maintenance and replacement of the industrial trucks. The conveyor serves as a traveling stockroom, thus releasing floor space for use in manufacturing operations. The conveyor system has linked together four different sections located in 12 separate buildings and maintains a uniform flow of material.

What Has Been Gained

To justify the installation of such a system, advantages have been derived which otherwise could never have been accomplished. They include (1) decreased handling cost, (2) reduced spoilage, (3) released floor space, and (4) reduced inventories.

Handling costs have been decreased by a saving in direct labor, the elimination of 624 hr. of porter labor a week, which was formerly necessary for the handling of material throughout the department. In conjunction with this, approximately 90 per cent of the spoilage and waste from the former handling methods, due to rough handling and weather exposure, has been eliminated.

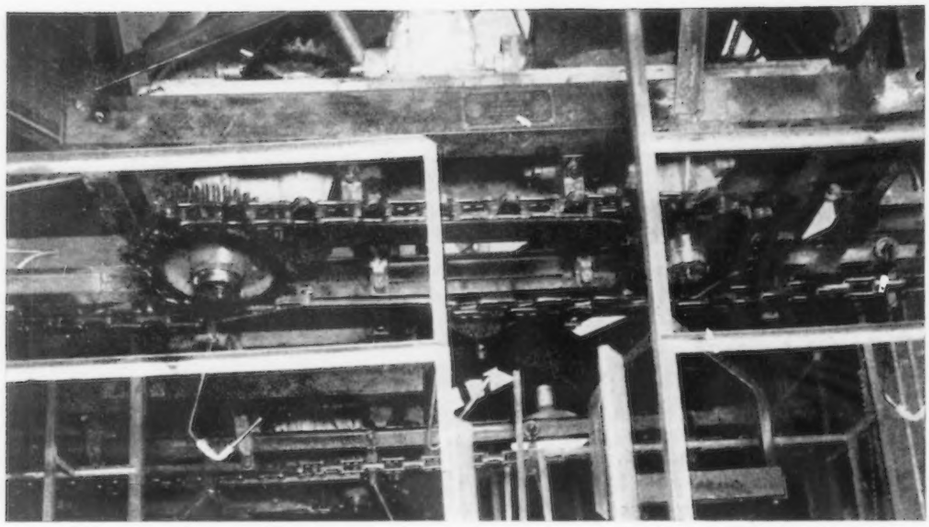
Also 140 trailers, one tractor and one electric lift truck were released for use elsewhere in the plant, and the necessary maintenance cost of keeping this equipment in working condition was done away with. By eliminating the use of this equipment, congestion from trucking within the buildings, on the works avenue and in courtyards has been relieved, all of which helps to improve working conditions and outside appearance.

Because of the increased speed and uniform flow of material and its storage on the conveyor, which serves as a traveling stockroom, the buffer storages before and after the lines of processing have been reduced. This releases floor space that can be used for manufacturing purposes and at the same time reduces inventory.

Can Use System as Pace Setter

In addition to these, the production department in charge of the material handled by this conveyor can control the work in process by regulating the speed of the chain. By governing the inflow of material to the assembly line, the contributing section can produce no more than the conveyor can absorb. Thus, the production department can automatically regulate the output of the contributing section to conform with the requirements of the assembly line, maintaining the same production schedule throughout the whole department, with a uniform flow of material, which reduces the inventory, and at the same time eliminate any chance of over-production in any one section.

Throughout this system there are 12 loading and unloading stations, where the various material parts are received from or loaded for other points on the system. Approximately 50 different parts are han-



FULL-FLOATING dual caterpillar drives with Reeves automatic adjustment. These two drives operate on oppositely moving sections of the conveyor in building 8-A, and are about equally loaded.

dled daily. These range in size from a small wood screw to the compressor unit which is mounted on top of the refrigerator, and in weight from one ounce to 75 lb.

On the present production schedule the chain is traveling at 26.6 ft. a minute, completing one cycle in 2 hr. 18 min., carrying approximately 85,000 pieces a day, a total load of 85 tons. The care with which this material must be handled, involving temperature changes, humidity, dust, grit and marring and scratching, was carefully considered in the design of this system.

Precautions Taken to Insure Satisfaction

Proper clearances and spacing of hooks were maintained, to insure against any possibility of marring and scratching of material. The hooks used for carrying the compressor cases are rubber covered, to prevent the burring of machined edges when loading or unloading. To prevent the collecting of dust and grit on the material as it passes through the housing located directly above the sand-blast building, between buildings Nos. 26 and 28, a dust-proof inclosure was necessary.

One of the largest spoilage losses which had to be overcome by this system was that from rust due to weather exposure. To maintain the same temperature in the housings as that in the buildings, all of the outside housings, totaling 1000 linear ft., were lined with ½-in. thick celotex and equipped with a steam-heating system. Approximately 90 per cent of the losses which occurred in the former handling method have been eliminated; all of which cuts down the cost of rehandling, reworking and loss of material.

Multiple Drives Are Automatically Synchronized

OUTSTANDING features in the design of this system are the multiple drives and the signal system. Automatically synchronized caterpillar drives used on this overhead chain conveyor installation consist of:

A standard caterpillar drive mounted on a cast iron base with Reeves speed variator. All are mounted on a structural frame floating on four heavy-duty ball-bearing rollers, with vertical ball-bearing rollers to take the side thrust. A special shaft extension is provided for the Reeves adjustment shaft. A pinion on the end of this shaft engages a rack attached to a fixed support, so that when the drive floats in either direction a resultant turning of the Reeves adjustment shaft occurs.

When the floating drive moves ahead, or in the direction of travel of the conveyor chain, the Reeves adjustment shaft turns so as to speed up the drive. Conversely, when the floating drive moves back, or in a direction opposite to the direction of travel of the conveyor chain, the Reeves adjustment shaft turns so as to slow down the drive.

A limit switch is placed behind the floating drive frame. Should a sudden overload be put on the drive, due to fouling of the conveyor chain, the floating frame moves back until contact is made with a limit switch, which stops all drives. The maximum allowable travel of the floating frame is 6 in., but in practice the travel is about 1½ in. The amount of pull the drive is to take is predetermined and compression springs are placed behind the floating drive frame, calibrated to withstand a reaction equal to the pull.

How the Adjustment Functions

In application of the above principles, let a conveyor be assumed with three drives driven by independent motors of the same nominal speed. (No special winding of motors is required.) Suppose each drive is intended to take one-third of a total chain pull of 3000 lb. The three drives are started instantaneously by a common switch; but, due to difference in motor windings, one of the drives runs slow and does not pick up its share of the load. This drive will move ahead with the conveyor chain, automatically turning the adjustment screw on the Reeves adjustment shaft to speed up the drive.

On the other hand, should the drive run too fast, tending to take more than its share of the load (1000 lb. pull), the springs behind the floating drive frame will compress, allowing the drive to move backward, automatically turning the adjustment screw of the Reeves adjustment to slow down the drive.

In using two or more drives of this type (the conveyor in question has three), it is advisable to locate drives so that an equal distribution of load will occur. Elements to be considered in determining distribution of load are (1) length of loaded conveyor pulled by each drive, and (2) uncompensated vertical lift of the loaded conveyor taken care of by each drive.

Many Advantages Discovered

Advantages of the automatically synchronized drive are as follows:

1—Conveyors of extreme length may be constructed using the same standard chain and trolley equipment commonly used for conveyors of short length. This is accomplished by keeping the chain pull at any point within the limits of good design for conveyors of ordinary length.

2—Drives may be placed at the most advantageous points, it not being necessary to group them around a countershaft or other medium of power.

3—Variation in pitch of conveyor chain is not important, as the floating-type drive automatically overcomes this variation by variation in speed.

4—The compression springs behind the floating drive take the shock of starting and also act as a cushion in case of a wreck, both of which tend to insure long life to the driving mechanism.

5—Limit switches behind each drive make it easy to locate trouble in case of a wreck on the conveyor. In connection with this feature, it is possible to install signal lights at a central location which will tell the operator in charge when a limit switch kicks out, and also in what zone the trouble is to be looked for. This will save considerable delay in getting the conveyor into operation again.

Safety Served by Signal System

Throughout this entire system, guarding for safety has been carried out to the most minute detail. Control switches, guards and signal horns have been supplied to insure safety to those working in the vicinity through which it travels.

At each loading and unloading station, a safety switch is located directly above the conveyor rail, within easy reaching distance from the floor. The switches are of the push-button type, equipped with a locking device, so that when the button is pushed the locking device must be unlocked before the switch makes renewed contact. The switches are so connected that they can be used only for stopping the conveyor. The one and only starting switch is at the control station, in building No. 8-A, which is operated by an officially appointed operator.

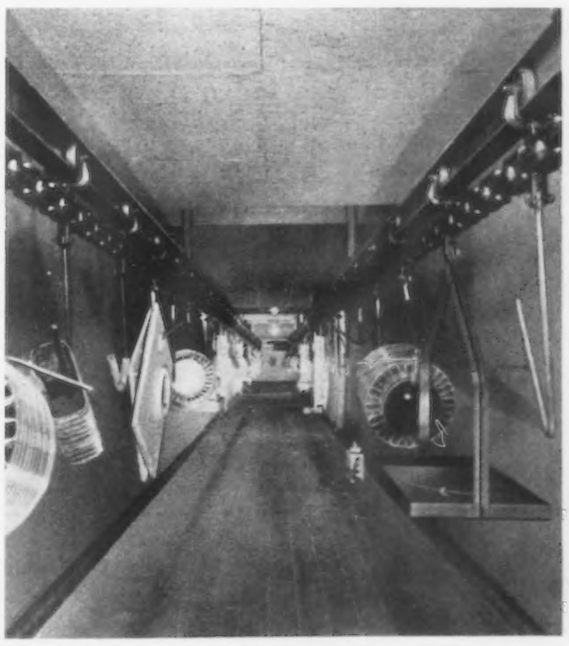
In case the conveyor is stopped by a safety switch, the control-station operator must receive word, from the station where the switch was used, that the line is cleared, before starting. Also a switch is located on the drive frame of each drive, so that the conveyor can be stopped in case of accident while making speed adjustments, the only work permitted to be done on the drives while the conveyor is in operation. At all places on the system where the material on the conveyor is below 7 ft. from the floor, safety switches are installed within reaching distance.

Horns Sound Warning Before Conveyor Is Started

To prevent any accident which might occur when starting the conveyor, a horn-signaling system was installed whose function is to give warning to those near the conveyor. Each station is equipped with a siren horn, connected to the starting switch, so that for approximately 10 sec. before the conveyor starts the horns throughout the system sound warning that the conveyor is going to start. Also a horn is located near each drive. To eliminate any possibility of a hazard while oiling, each drive has been equipped with a one-shot lubricating system.

One of the difficulties which arose in having such a large number of stop switches, located at points in eight different buildings, was the lost time in locating a locked switch, after the conveyor had been stopped. To overcome this a tell-tale lighting system was installed.

It is very important that the system be put into operation as soon as possible after a shutdown, as all three assembly lines depend upon this installation for their source of incoming material. Each stop switch is connected to two lights, hooked in multiple, placed on a panel board, near the starting station. The stations are numbered in rotation, corresponding to those stations numbered on the panel. When the conveyor is stopped, the operator at the control panel is able to tell instantly which stop button was pushed. He can then communicate, finding out whether or not the line is cleared, so that he can again start the conveyor.



INTERIOR of covered passageway, showing two sections of the conveyor moving in opposite directions. That at right is coming toward the observer and vice versa. Adequate walk space is provided between the two lines. To avoid moisture and great temperature changes this passage is lined at top and sides with Celotex.

LOSS OF HEAT AND LIFE OF ROOF

By DIPL. ING. ALBERT SCHLÜTER

LITTLE has been published about the deterioration of an open-hearth roof during one campaign or about the changes in the heat losses of the roof during a campaign. Simple measurement of the temperatures will solve these problems.

During a full campaign, from the date of rebuild-

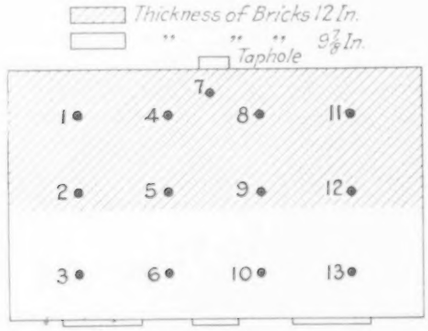


Fig. 1—Make-up of roof and locations of points of measurement.

ing of the roof of an open-hearth furnace to the shutdown, the surface temperatures on the roof were taken at different points. At shutdown the roof was not used up, except for a place above the taphole. The furnace had a capacity of 17 tons, and the roof was made of 9⅞-in. and 12-in. bricks, the thinner ones on the charging side. Fig. 1 shows the locations of point of measurement, and the table shows the temperatures which were taken on four days at intervals of about 11 days and the approximate distribution of temperatures on the surface at different times during the campaign.

It was surprising that during the first days the temperatures were markedly higher than later on, and showed high variations. This can be explained by the pressure inside the furnace; before the bricks are glazed over at the inner surface, and have formed a coherent layer, the gases will penetrate through the joints and raise the temperature through the brick and at the outer surface. In fact, the temperature decreases after this flow of gases through the roof ceases.

After this early irregularity, the curves of the time-range of temperatures show a rather equal flow, but after some time an increase of temperature appears. At temperatures above 500 deg. C. the increase seems to slow up.

Loss of Heat Is More Rapid Than Temperature Rise

Considerably faster than the elevation of temperature is the rise of the resulting heat losses, as shown in Fig. 2. The curves of Fig. 3 show the total heat losses of the roof, as its age increases. For calculation of the values, the roof was divided into sections and the mean temperatures of these sections were used. The diagram gives also the proportional share of the loss on the heat consumption of the laboratory and the total heat given off.

Roof heat losses rise about threefold from the beginning to end of the measurements in relation to the total heat consumption of the furnace—from 3.21 to 8.5 per cent. The roof loss gains importance from the fact that the heat consumed in the inside of the furnace itself is the highest of the whole operation. The proportion of the roof loss to the heat consumption of the hearth increases from 8.89 to 22.6 per cent.

Assuming that the mean inside surface temperature of the roof remains the same during the cam-

Temperature Records of Roof Brick at Intervals of About 11 Days, in Deg. C.

Point of Measurement		March 4	March 14	March 26	April 7
1	(a)	305	325	400	510
2	(b)	315	350	435	530
3	(c)	310	330	380	450
4	(a)	310	350	440	520
5	(b)	310	345	435	540
6	(c)	320	360	410	468
7	(d)	305	420	500	560
8	(a)	305	340	440	540
9	(b)	305	350	435	560
10	(c)	315	350	420	460
11	(a)	305	325	420	530
12	(b)	310	350	430	560
13	(c)	305	330	380	450
Average of (a)		306	335	425	525
Average of (b)		310	349	434	548
Average of (c)		313	343	398	457
Average of roof		309	348	425	514

(a) Near back wall.
(b) Along center-line of furnace.
(c) Near front wall.
(d) Over taphole.

Translated by H. Illies, Amberg Opf., from *Stahl und Eisen*.

OF OPEN-HEARTH FURNACES

STUDY of the factors influencing the life of an open-hearth roof, based upon temperature measurements at various points in the roof and at occasional intervals, has shown some interesting results. It is found that the losses of heat through the roof bear an increasing relation to the consumption of heat in the furnace laboratory as the roof gets thinner through wear. Some interesting observations are made on the normal deterioration of the roof and on the rate at which it burns off.

paign, the temperatures of the outer surface give an indication of the remaining thickness of the roof and of its progressive deterioration. The relation between the thickness of the roof and the temperature of the outer surface under these suppositions is shown in Fig. 4.

It follows that the thickness of bricks at all places of measurement decreases proportionally to the length of campaign. The rate of deterioration differs at varying places of measurement, and the deterioration is heavier at the backwall and highest above the taphole. The unequal deterioration is not influenced by the different thickness of the bricks, but only by the small differences of temperature of the inner surface of the roof and by the variable heavy attack by lime, slags, etc. The unequal temperatures are the result of entrance of uncontrolled air through the doors and of stronger heat radiation of the roof toward them.

Gradual Erosion or Melting of Brick Substance

The constant deterioration with passing of time —in other words, the rate of erosion of the bricks— is caused by the normal operation of the furnace. It is intended to operate with as high a temperature as possible, but this value is limited by the quality of the bricks. The inner surface temperature is kept always a little below the temperature at which the bricks soften and begin to run.

On the inside roof surface a thin liquid layer is formed which slowly flows to the sides or drops off. How fast this process takes place depends on the

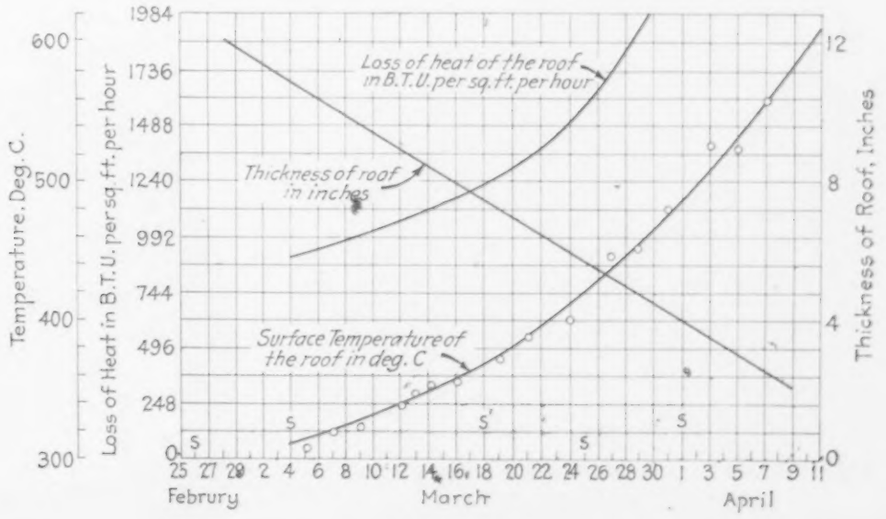


FIG. 2—Flow of temperature, loss of heat and deterioration of roof at point 9, original thickness of brick being 12 in.

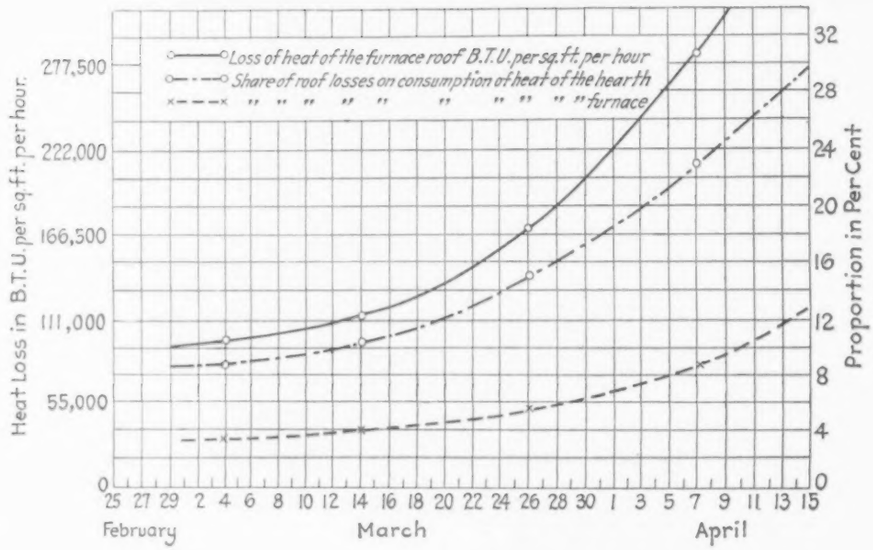


FIG. 3—Total heat loss through the furnace roof and its proportion to the heat consumption of the hearth and of the entire furnace.

quality of the bricks, their composition, porosity, on the amount and composition of slag going into reaction with the brick, and on the temperature.

The depth of penetration of temperature into the brick or the thickness of the zone of "liquidation" is proportional to the thickness of the brick. Therefore the rate of dropping off must be proportional to the thickness of the brick, which is the case in many furnaces. But here this influence does not generally exist, as the rate of erosion did not decrease with decreasing thickness of the brick.

Its thickness depends less on the depth of penetration of temperature than on the volume and kind of the slag-forming substances on the brick. The depth of penetration of the scorification, and therefore the thickness of the liquefied layer formed, seems usually to be small and depending little on the temperature. Only in this way can it be explained that, with great thickness of the roof, and therefore a flat range of temperature in the brick, the deterioration is not accelerated. Under very strong cooling (with very thin roofs or with artificial cooling by compressed air) the layer seems to be decreased and the deterioration prolonged.

From the above it can be inferred that, for the usual erosion of a roof, besides its fire-resistance, its resistance to attack by slag, lime or ore dust is of greatest importance. By usual erosion is meant the gradual scorification of the roof aside from the deterioration by superheating or burning off.

Each roof is, however, sometimes locally superheated, so that the fusion point of the brick is reached and it begins to run. In this case the thickness of roof influences, of course, the result of such a superheating, and therefore the deterioration of the brick. The thicker the roof is, the flatter is, of course, the flow of temperature and the deeper into the interior does the super-temperature penetrate.

Continually increasing sensitivity to attack with increasing thickness of the brick limits the economical thickness. The smaller the danger of burning off, the thicker the roof may generally be made. The danger of burning off depends on the flow of gases and their control, and not on the thickness of bricks.

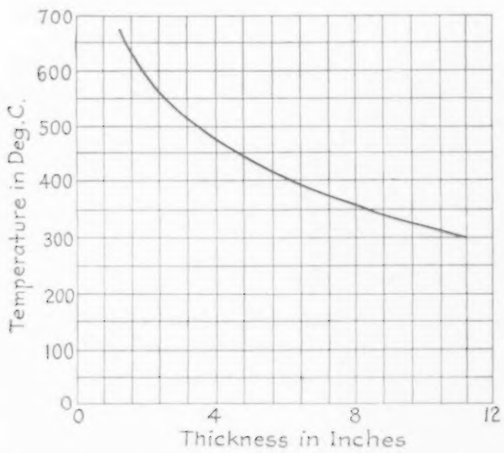
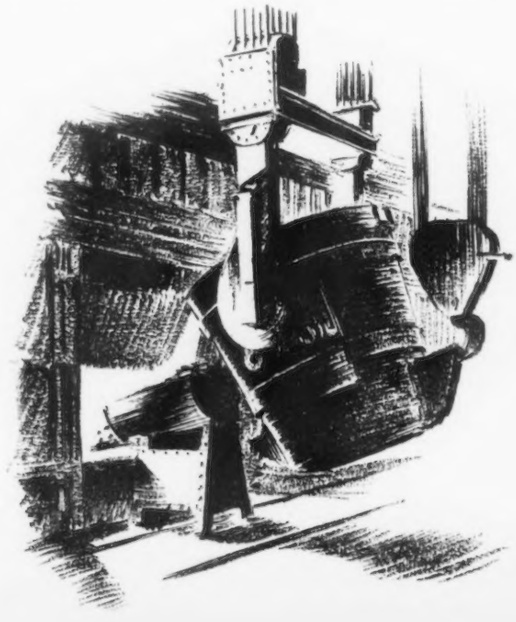


Fig. 4—Dependence of surface temperature upon changing thickness of roof.



Golden Gate Bridge to Be Longer Than Hudson River Bridge

BIDS for the construction of a highway bridge crossing the Golden Gate at the entrance to San Francisco Bay are to be opened on June 17. The plans for this bridge contemplate a suspension structure, measuring 4200 ft. between centers of supporting piers, with suspended side spans of 1125 ft. each, making a total suspended length of 6450 ft. These figures compare with the 3500-ft. main span of the Hudson River bridge from Manhattan Island to Fort Lee, N. J., and side spans of 650 ft. each, or a total suspended length of 4800 ft.

Considerable detail regarding the steel members of the projected San Francisco bridge are given in a recent issue of *Engineering News Record*. Some of that information is carried in the following paragraphs.

In spite of the considerably longer structure at San Francisco, the cables are only slightly larger than those at New York, and there will be only two cables in the California bridge, whereas four are used at New York. The comparative steel sections for one cable are 830 and 800 sq. in. respectively. The Golden Gate cables will be 36¼ in. in diameter after compacting. They will be made up of 27,572 galvanized wires each, arranged in 61 strands of 452 wires each. These wires have a diameter (before galvanizing) of 0.192 in.

Each tower, 746 ft. high above water, will be of steel without masonry casing. The tower legs are spaced 90 ft. apart. The steel area of each tower leg varies from 7527 sq. in. at the bottom to 3895 sq. in. at the top.

This new bridge is designed for an equivalent dead load of 21,600 lb. for each linear foot on the main span, and 20,300 lb. on the side spans. The equivalent live load for the entire bridge when loaded is 4000 lb. to the foot, with 500 lb. added for conduits.

Much Silicon Steel to Be Used

Except in the stiffening trusses, lateral bracing floor beams and stringers, carbon steel is designed on an 18,000-lb. basis and silicon steel on a 24,000-

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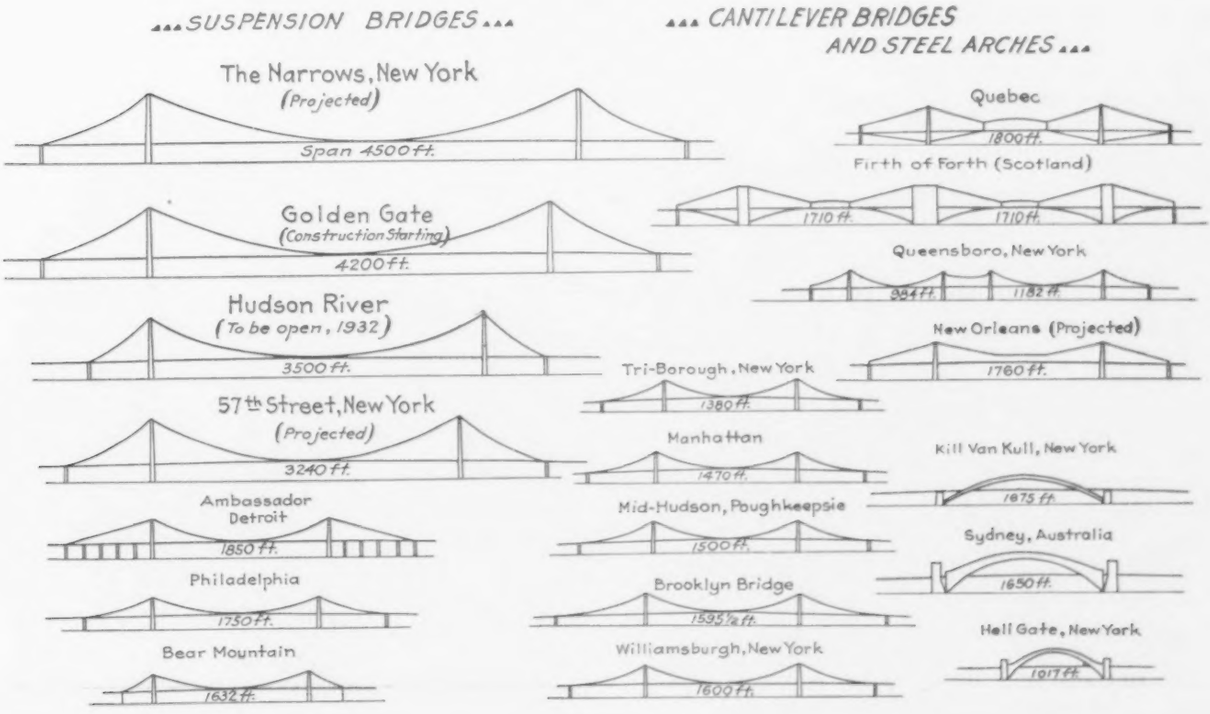


MANUFACTURE OF LEAD COVERED TELEPHONE CABLE

DISCUSSING methods of manufacture of lead-covered, paper-insulated telephone cable before a meeting of the American Society of Mechanical Engineers in Cleveland, John R. Shea, assistant engineer of manufacture, Western Electric Co., Kearny, N. J., told of modern practices developed by his company for use in its new Point Breeze plant, near Baltimore. Among other things, he showed a system for central heating of lead supplying a battery of extrusion presses used in applying the lead to the cables. What follows is quoted from his paper:

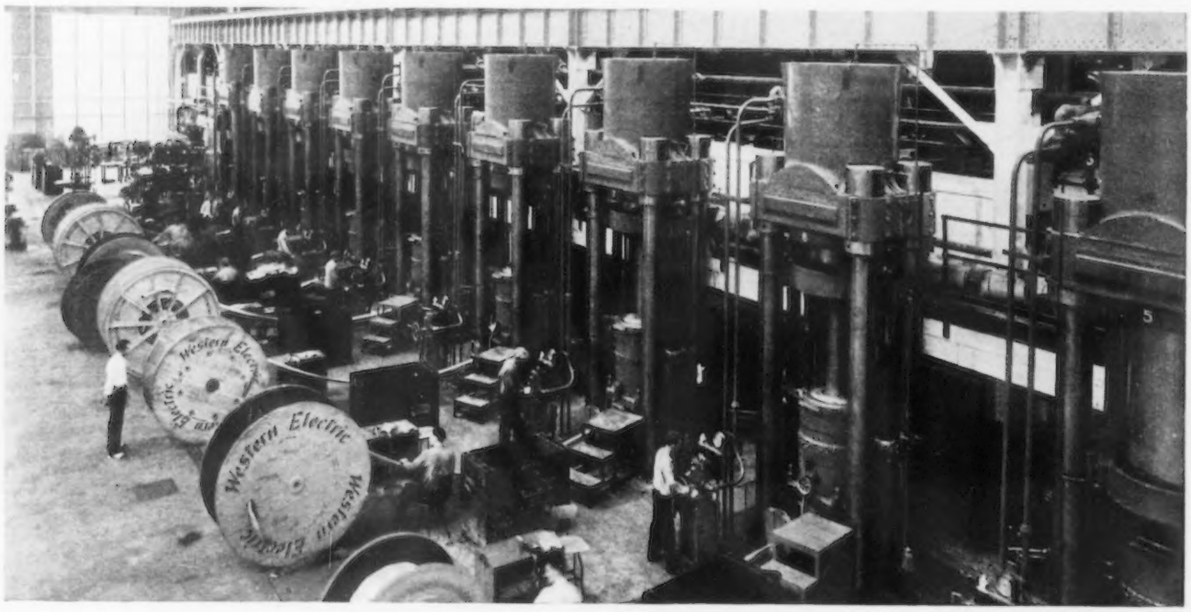
Lead Sheathing

The thoroughly dried cable core passes from the storage oven through a tube, designed to minimize any exposure to outside air, into the press where it receives its protective cover of lead. The basic principle of applying lead sheath to cable is illustrated by the diagram, which shows a cross-section of a typical die block. The die block is placed underneath a large cylinder for receiving molten lead, and both are placed in a hydraulic press.

The latest type of press used at Baltimore, illustrated in the general view of the press room, is known as the 34-in. inverted press. Its stroke is 56 in.; the diameter of the ram is 10½ in., with a lead capacity of 1800 lb. to the charge and a maximum extrusion rate of 5680 lb. an hour. (Total pressure during extrusion, 59,000 lb.).

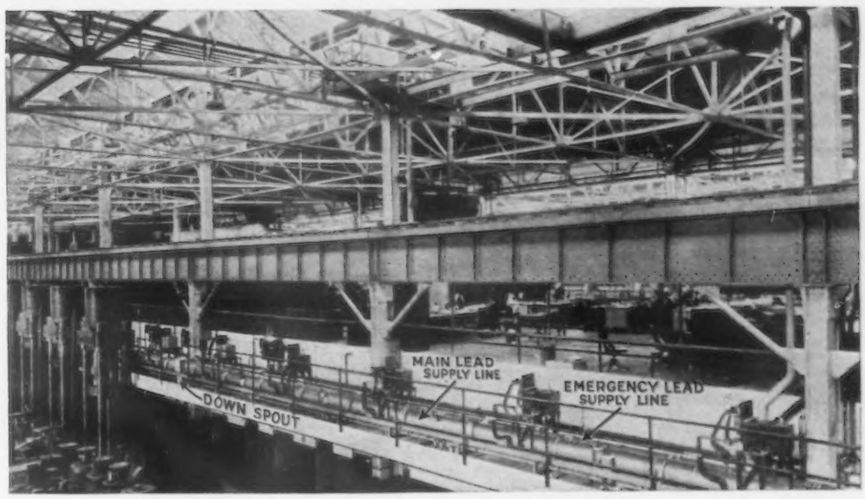
This press is approximately 21 ft. in height above the floor line, and has the water cylinder mounted between the four columns at the top. The four steel columns supporting the top castings are 12½ in. in diameter. The 34-in. diameter water ram has the steel lead ram bolted to it. Connection is made from the water cylinder to a hydraulic pump, supplying water at a maximum pressure of 5500 lb. to the square inch.

At the floor level of the press there is a cast steel plate which carries a steel spacing block upon



Battery of 34-in. lead presses used in sheathing cable.

which the die block rests. Above the die block is a water-jacketed lead cylinder, exactly centered over the feed orifice of the die block. The die block and lead cylinder are held in place on the cast-steel plate by four 2½-in. bolts. All these parts are stationary on this press, facilitating handling and inspection, and insuring that the cable core always enters and leaves the die block at the same angle.



Main lines supplying molten metal from central melting kettle to lead presses.

Concentricity of the sheath is affected not only by the contour of the extrusion chamber, including core tube and die, but also by the manner in which heat is applied. The thickness is affected by temperature and speed of extrusion, so that the human element is an important factor, and it is necessary to have thoroughly trained and reliable operators on this kind of work. Temperature indicators are used to show die-block temperatures, and the temperature of the molten lead is automatically controlled and recorded.

Accuracy of the Application of Lead

All of the lead alloy is melted in a large furnace at a central location, and distributed through a long-loop pipe line running back of the presses. Near each press a loop branch from this line is made and equipped with the proper kind of control valve. This line is heated electrically and the lead is in constant circulation.

To take full advantage of such a system, the presses were placed close together, thus saving the space formerly occupied by the small individual melting kettles. The large central-supply kettles were placed adjacent to the lead storage pit, to minimize handling.

Three oil-heated kettles are used in the central melting system. The middle kettle is used for melting and preparing the alloy to the exact composition. The second kettle is used as a main supply and connected up to the distributing system. The third kettle is a spare, and the piping is so arranged that it can be used either as a melting or a supply kettle.

Each kettle has a capacity of 120,000 lb. of lead, and the melting capacity of the system is 80,000 lb. an hour. Space is provided for a fourth kettle, to take care of the ultimate expansion of the cable plant.

Lead and Antimony Charged into Kettle

Each kettle has two sets of one large and one small low-pressure oil burner installed diagonally across from each other. An impeller type of vertical pump having its intake about 12 in. above the bottom of the kettle, and driven by a 20-hp. vertical motor, creates sufficient agitation by the circulation of the metal to assure a uniform composition.

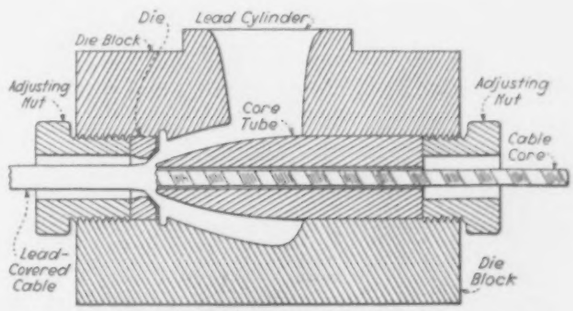
Charging of the melting kettle with virgin lead is accomplished by means of a specially designed lead-handling grapple, which has a capacity for 100 billets of the standard size, or a total weight of about 8500 lb. Five to six of these charges, or about 40,000 to 50,000 lb., constitute one melting cycle.

The corresponding amount of antimony is loaded into a special cradle, which moves in a separate chamber and is lowered well below the surface of the lead, where the antimony is dissolved by the washing action of the stream of lead from the return line of the pump.

No Fittings Used in Pipe Line

The main-line piping system is made of seamless steel tubing supported on a roller-conveyor system to take care of expansion and contraction, which amounts to 6½ in. for each 100 linear feet at 750 deg. F., or to a total of approximately 20 in. under normal working conditions for the system.

Down spouts are of seamless steel tubing and have a steel valve at each joint with the main line and a service valve at one corner of the U-bend. All joints are oxyacetylene welded, and no fittings are used throughout the system. The lines are insulated with pipe covering protected by a layer of fireproofed canvas.



Cross-section of typical die block used in applying lead sheath to cable.

CHROMIUM PLATING FOR WEAR

◆ ◆ ◆

ANODES are of a great variety of shapes and sizes, although the largest number are cylindrical. They vary in diameter from 1/16 in. to 24 in. and in length up to 48 in.

In order to secure rigidity, ample current-carrying capacity and proper "gasing" action, considerable thought is given to details of anode construction. They are all fabricated on the premises, commercial 1/16 in. and ⅛ in. sheet lead and pipe being used exclusively, it having been found much easier to work than the 6 per cent antimonial lead type. Its resistance to deterioration has also been sufficient to justify this practice. Some 1-in. diameter by 1-in. long cylindrical anodes of 1/16-in. lead, which have been used 300 hr. (150 two-hour immersions) to date, are in excellent condition.

Supporting straps of steel are incased to a few inches above the solution level in 1/16-in. sheet lead and all lead joints are made by "burning" with an oxy-acetylene torch. These burned joints provide a liquid tight seal, thus protecting the steel "backbone," and insure permanent, good conductivity between anode and strap. About the only problem concerning the flat anodes used for surfaces is the "bulge," which must be proper, i.e., so that the center of the anode is nearer the work to give uniform current density. A few cylindrical ones must be made in halves, each half with a separate hanger, for such work as crankshafts. Others are made split so as to permit "closing in" to accommodate various diameters.

One type has the straps burned on while the other consists of a split cylinder with current-carrying strips of lead burned on. This latter type is supported in separate lead-sheathed hangers with hook ends. By using different hangers this type may be used vertically, horizontally or at any angle. When used in multiples to obtain length, one hanger supports the adjoining ends of a pair thus reducing the number of hangers required. On all anodes of any appreciable area a number of small holes, about 3/16 in. in diameter, are burned in the surface to facilitate escape of gas.

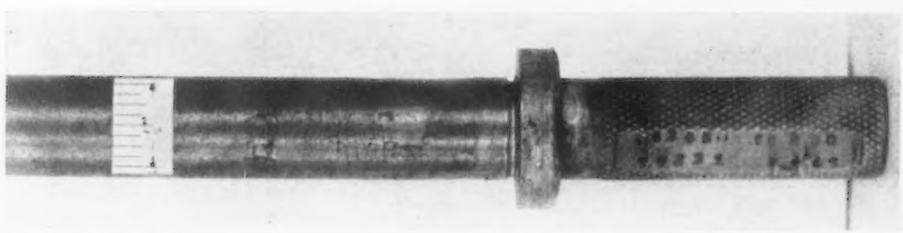
Selection of Anode for a Given Job

To insure maximum tank capacity and minimum anode cost it is obvious that the anode selected for a given job should be the one which gives minimum anode spacing—anode to work distance. As the spacing decreases, however, the variations in current density and consequently thickness of plate, due to slight inaccuracies in spacing, are magnified. The spacing in use at Phillipsburg varies from ¾ in. on ¼ in. external diameter work to 1½ in. on 6 in. diameter or larger. This has been found satisfactory when used with anodes made to a readily attainable degree of accuracy and set up with reasonable care. It may be noted that at these spacings, 3.5 to 4.5 volts are usually required to give the 2½ amp. per sq. in. at which the steel jobs are usually run.

Lower density, of course, means slower plating. Excessive density results in a rough and non-adherent plate such as shown in one of the illustrations. Attention is also called to the "treeing" effect at the extreme end of the piece. Sand-blasted surfaces require a slightly higher voltage, especially in starting. Cast iron is usually run at 4 amp. per sq. in.

For long cylindrical jobs plated horizontally a narrower spacing than customary is sometimes used to prevent pitting along the bottom. This is accomplished by inducing sufficient solution flow to wash away the gas bubbles which form along the bottom of the work.

When plating up to a shoulder or face the anode spacing is sometimes decreased at this point by



▲ ▲ ▲

A piece of work which was checked in grinding.

▼ ▼ ▼

RESISTANCE

By ROBERT D. ZIMMERMAN
Metallurgical Department, Ingersoll-Rand Co., Phillipsburg, N. J.

THE large variety of anodes necessary in chromium plating parts subjected to wear, and the selection of the proper one for a given job are described by the author in this article, which supplements the one published in THE IRON AGE of June 4. Two kinds of production fixtures are used, one for miscellaneous gages and shafts and one for handling identical parts in large quantities.

The method of finishing the plate and its properties are gone into. Plated parts which are now in service are listed.

turning the anode edges inward so as to counteract the robbing effect of the face.

Work Racks and Setting Up

Work racks consist of assemblies of cold-rolled steel members fastened together by bolts. This part of the equipment corresponds in principle to the familiar "Mecanno" sets for boys. Being always used on the cathode side of the circuit, these racks need no protective covering to prevent attack by the solution. Due to the slight frost of chromium deposited upon them, they usually do not rust when not in service. Electrically, steel is, of course, not the best material to be used in a process which requires considerable current. However, the cross-sections to meet requirements for mechanical rigidity are usually greater than required electrically.

Setting up consists of bolting the work racks to the composite bus bars, bolting the work in place and fitting the anodes, although, as mentioned before, they are not actually fastened in place until the work assembly has been electric-alkali cleaned. Jobs which will permit are set up vertically, i.e., the surface to be plated is set in a vertical plane, since in this position it is easier to get rid of the gas.

If any portion of the work within effective range of the anodes is not to be plated, it is protected with lacquer or with sheet lead. If lacquer is used, it is applied after electric alkali cleaning. Since lead shields need not be liquid-tight, they usually are simply a piece of sheet lead wrapped about the work and wired in place if necessary. For keyways a piece of lead sheet is simply hammered or pushed into place. Where the use of lead is impracticable, lacquer is resorted to.

Production Fixtures

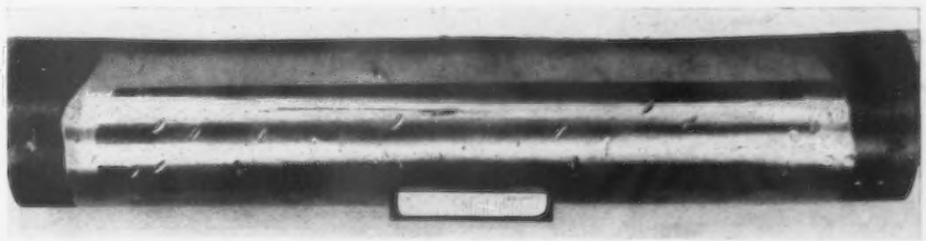
There are two kinds of production fixtures: (1) those for plating a number of similar parts at the same time and (2) those for plating a number of identical parts.

In the first class come the special work racks for holding miscellaneous gages and shafts. A variety of anodes, a number of each of quite a range of sizes, is provided for this work.

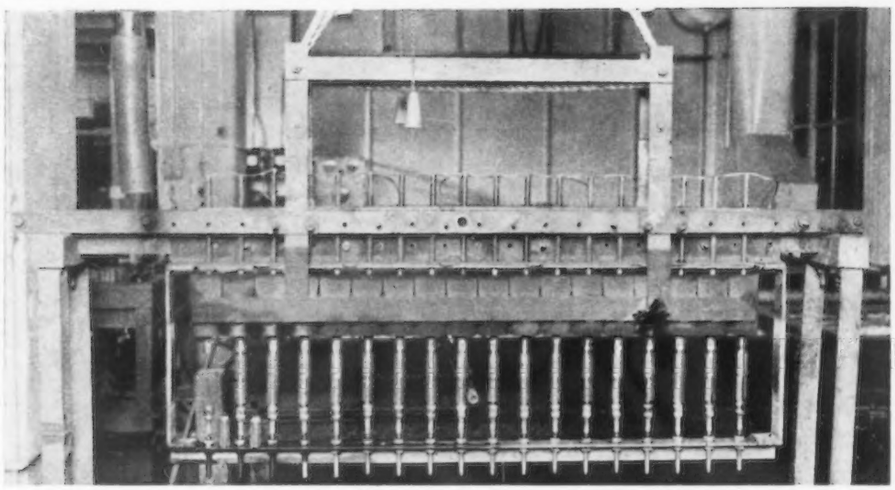
For handling large quantities of identical parts, composite fixtures are constructed. Some of these have capacities of 200 pieces. They consist of multiple work-holders and anodes arranged to permit assembling to the composite bus bar as a unit. In some cases these are of the single-purpose type, but when possible they are built so that, by insertion of spacers or by other minor adjustments, more than one job may be plated. For instance, pins of various lengths may be plated in one fixture.

Special attention is given to provide for rapid loading and unloading. Spring-actuated work-holders are used whenever possible.

In some cases the anodes are of the fixed position type, i.e., they are not removed from the composite bus bar—work rack assembly and the work are posi-



A chromium plate, 0.007 in. thick, which was purposely dented.



One of the fixtures used in the plating baths.

tioned with reference to them instead of the anodes being assembled to the work.

Another type is provided with anodes which raise as a unit to clear the work and then lower into plating position after the fixture has been loaded. These are used on jobs where electric alkali cleaning may be omitted. If this cleaning is necessary, the raised position is such as to bring the anodes above the solution level. When the weight of the anodes is sufficient to justify such an arrangement the anodes are arranged for raising and lowering with the air hoists.

In the design of all types of production fixtures, efforts are made to insure uniform current distribution and a minimum loss of chromium through useless deposition upon the work-holders. Wherever practicable work fixture joints which come below solution level are made by welding. One of the fixtures is shown in an illustration. In this fixture the anode assembly is raised and lowered with the air hoist. Flexible wires to insure uniform distribution of current may be seen soldered to top ends of the vertical work-holding plungers.

Finishing the Plate

The usual amount of plate removed in grinding has been set at 0.003 in. on the diameter of a round piece. This is being done with the same wheels as used for grinding hardened steel, although a lighter cut is taken and the time required is from one and one-half times to twice as long and the wheel must be dressed more frequently. Considerable heat is generated in the process, as evidenced by the intense white spark, and plenty of coolant is necessary. When extreme accuracy is necessary, it is obtained by lapping. A piece of work which was checked in grinding is shown in another illustration.

Except to say that it is of course file-hard, no definite measure has been attempted of the hardness of the plate applied under the particular conditions existing at Phillipsburg. It may be said, however, that service reports on plated parts are most often three to one as compared with hardened steel, this relation representing the comparative resistance to abrasive wear.

The Finished Plate

One is easily impressed with the truth that chromium is hard. Its greasy "feel" also instills a sense of suitability as a rubbing surface. However, assurance that it will not peel or chip is not so easily obtainable. That the desired adherence can be obtained is evidenced by such plated jobs as centerless grinder work rests and drill jig bushings, which have been found very satisfactory. In one illustration is shown a 0.007-in. thick plate which was purposely dented. The plate did not "jump off."

Drill bushing application has been found exceptionally fortunate when close spacing requires a wall thickness so light as to make hardening a problem. By using chromium on a wide variety of shop repair jobs, a considerable fund of information is being built up which includes data upon the action of the plate on many types of service.

At present parts are in service such as tool slides, boring bars, milling arbors, shaper crossheads, grinder spindles, shafts and plungers of various kinds. Before regular application is made to any part of the product of the company, adequate service tests are of course also carried out. From data collected so far it appears that chromium plating is a definite process which must be very carefully handled but for which there is a wide application.

Excessive density causes a rough and non-adherent surface.

Reducing Losses by Systematic Disposition of Inactive Stocks

By T. O. ARMSTRONG
Supervisor Material Disposition Division, Westinghouse Electric & Mfg. Co., Springfield, Mass.

ONE of the leaks in business is the money tied up in surplus or inactive stocks—materials that pile up because of changes in processes of manufacture or because of purchases in excess of requirements. The Westinghouse Electric & Mfg. Co. has worked out a system for the disposal of such surplus or inactive stocks, under the supervision of a separate department. This article, written by the supervisor of that department, tells how this large company reduces costs by keeping a constant check on excessive or obsolete material or fabricated parts.

PREVENTION of the accumulation of excess stocks and materials and the advantageous disposal of non-preventive accumulations of such stocks afford an effective means for curbing losses in all lines of manufacture, and, in many cases, of keeping the balance on the right side of the ledger. This fact is often lost sight of in busy production periods, with the result that in dull periods, when much greater stress is applied to the reduction of losses, it becomes apparent that the profits have been far below expectations. All too often it is found that defective work and excess and inactive stocks are the stumbling blocks to a favorable showing in the profit-and-loss column.

Many things can be done by all interested in the manufacture of a product to prevent the accumulations of excess or surplus stocks.

Some of these measures to be considered are already known, such as:

Designing of apparatus with particular reference to standards and manufacturing feasibility, etc., all of which tend to limit the possibilities of faulty or inaccurate work, over-ordering, special materials, thus decreasing the amount of excess or surplus stock.

Accurate and proper specifications, with an effort to use standard materials wherever possible.

Accurate assigning, scheduling, and the proper scrutiny of orders so that materials will not be purchased that might later prove to be surplus or inactive. Great care should be taken by departments requesting materials and supplies to be sure only those that can be used within a reasonable time limit are purchased, otherwise heavy losses may be encountered through the accumulation of unnecessary stocks and materials, particularly with reference to materials of a special nature carried by one department or another for a particular purpose such as maintenance items.

Surplus Stocks Can Be Eliminated

Investigations made over a period of years by the materials disposition division of the East Springfield, Mass., plant of the Westinghouse Electric & Mfg. Co., have shown that, by proper analysis, slow-moving, doubtful materials can be largely eliminated and that undesirable excess stocks can be disposed of to advantage.

The result of the analysis applied at this plant has shown that there are two primary classes of materials and apparatus to be considered, namely, surplus stocks, or those regularly used but which are greater than required over a safe investment period, and inactive stocks, or those that have become obsolete.

Inactive stocks are defined by Westinghouse as stocks that have been on hand for one year or more in which the stock on hand is in excess of a predetermined amount, or two years' supply based on a 12 months' activity.

Surplus stocks are defined as the materials on hand in excess of activity over a 12 months' period.

In a sense, these classes are similar, the surplus stocks being essentially an over-stock, while the inactive stocks are no longer usable in their present state or for the purpose originally intended.

The three classes of surplus or inactive stocks mainly dealt with are:

(1) Unfabricated parts, such as iron, steel, copper, hardware, etc.

(2) Fabricated parts, designed specifically for a certain kind or type of apparatus.

(3) Finished apparatus, when the possibilities of application or sales advantageously are widely remote.

Preventive Measures Adopted

A department specializing in the advantageous disposal of the first two classes of materials is maintained at our works for the purposes mentioned above. By its experience and analysis, this department prevents accumulations as well as suggests preventive measures.

Apparatus or materials in any of these classes, whether from stock, the yard, maintenance sections, or shop departments, are reported to this department on what is known as an inactive stock report. This report is made up by the ledgerman of the order division in three copies, a copy of which is kept for his own record and two for the materials disposition division. One of the latter copies is used by this division for filing and record purposes, while the other is for routing to the various departments for suggestions and recommendations.

On this report is included such information as: reason for reporting this stock, reason for the purchase of same, activity for the past two years, purchase order number, and the disposition recommended in line with existing information, etc. This information is readily at hand on the ledgerman's card, for transfer to the inactive stock report, and is essential to the disposition division in order to avoid detail checking by the latter section to dispose intelligently of the item in question.

Reports Routed to Departments

These reports are routed to several departments—engineering, shop, sales, and other departments depending on the class of material—to find a suitable application for the stock or a possible future use. Anything may be reported on this report from sheet metals to all sizes and forms of fabricated parts and office supplies such as pins, paper clips, etc.

Such items routed to the shop may

A BLANK called an "inactive stock report" is used by the materials disposition division of the Westinghouse Electric & Mfg. Co., Springfield, Mass., to list unused apparatus or materials. These reports are sent to various departments to find a suitable use for the equipment or material. Inactive stock is not scrapped until every possibility of further use has been exhausted.

Report No. _____

INACTIVE STOCK REPORT

Based on Past Issues, Stock on This Account Exceeds Twelve Month's Supply

Date _____

Style _____ Sub. _____ Led. _____ Date Rec'd _____ TOTAL ISSUES Year Amt. ISSUES FOR SUPPLY ORDERS Year Amt. PREVIOUS INACTIVE REPORTS

Pattern _____ Sub. _____ Vol. _____ Stock Order _____ 192.... 192.... 192....

Drawing _____ Item _____ Storeroom _____ Req. No. _____ 192.... 192.... 192....

192.... 192.... 192....

Description of Material _____

Part of _____

STOCK SPEC. NO.	MATERIAL USED BY SECTIONS	DATE OF LAST ISSUE			QUANTITY INACTIVE	VALUE EACH	TOTAL VALUE
			Reason for having stock	Present Value			
				Depreciate %			
			Disposition Recommended by Stk. or Shop	Depreciated Value			
				Signed		Dept.	

ENGINEERING DEPARTMENT RECOMMENDATIONS

SALES DEPARTMENT RECOMMENDATIONS

Final Disposition _____

Signed, Disposition Dept., Per _____

Form 1401-F—W. E. & M. Co.—Works Dept. Printed in U.S.A.

be cast parts, frames, brackets, sheet or strip metals, etc. The latter may be sheared to certain widths necessary for a punching or lamination in the punch press department.

On any items the engineer may have an application in present designs or in new or special apparatus coming through.

The sales department may be interested in fabricated and complete parts, possibly to advise customers of the stock on hand which would be beneficial to them for service parts on apparatus already purchased.

Bulletin Boards Advertise Excess Stock

A unique and helpful manner of advertising such items in the shop is by means of bulletin boards. On these boards special posters are shown to employees, listing items which are inactive and of considerable value, and on which the company would welcome suggestions for their advantageous disposal. These suggestions are sent in to the suggestion committee and forwarded to the disposition division, and, if found to be acceptable, a suitable reward is made. A good many such suggestions are submitted by employees.

If it is found that the items cannot be applied within the works, they are then advertised throughout the other plants of the company in an endeavor to find an application elsewhere, this, of course, depending wholly upon the item and its value.

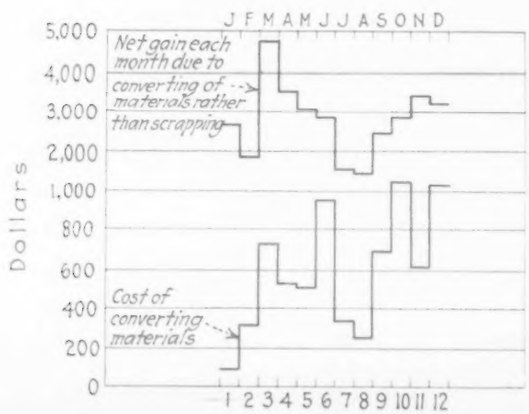
There are many items, such as raw materials, that are applied in this manner and many which are referred back to the suppliers in order to get expressions from them regarding the possibilities of return for credit or a price. Unless unfabricated materials are cut to special sizes or have been especially manufactured, there is a market for them either by return to the supplier or by sale to other manufacturers or dealers.

Bulletin Distributed to Company Plants

For the purpose of a single record of materials of this nature for prospective purchasers, an excess materials bulletin is used. In this bulletin, all of the excess unfabricated materials and hardware located at the several plants of Westinghouse are listed alphabetically, with complete descriptions, including the characteristics of the materials as described under the identifying number. This thorough description of the materials enables any one to tell what they are best suited for. This bulletin is distributed to all company plants as well as to other manufacturers and dealers. In fact, this bulletin is the medium by which our excess of unfabricated materials is offered for sale both within and outside the company's organization.

A similar bulletin is also composed of items similar to the above, but with more detailed information for distribution within our own works, and this bulletin is sent to each foreman, his assistant, production men, heads of departments, and in fact to anyone who may be able to reduce the invest-

(*Concluded on page* 2025)



IN this graphic summary is shown the actual cost of converting material each month. The upper part of the chart shows the net gain each month due to the conversion of material. This diagram bears out the author's statements relative to the study of possible applications of material that would otherwise be scrapped.

BACKBONE OR WISHBONE?

SOME one has said that "this depression is turning many backbones into wishbones."

The depression did not do this. The easy times which preceded it were responsible for the spinal softening. Jobs for the asking; profits for the picking; the "new era" thought of wealth without much work.

As a matter of fact, these recent strenuous months have been gradually changing wishbones back into real backbones. Depressions cure or kill.

Hard times have always fostered American progress and strengthened American character. Witness the bloody years of travail which made and preserved us a nation. Witness the winning of the West by our pioneer forefathers. It was not done through "easy times." Money they had not; hunger, danger and discomfort dogged their footsteps. It was a red-letter day to them that was without its queta of real privation. Yet they won through. They had backbone—not wishbone.

And we, their descendants, are baffled and bewildered by the fact that we have more money, food, comforts and conveniences than we know what to do with. A state of overproduction? Shades of our grandfathers!

All that we need today is more backbone and less wishbone. There is no use or hope in waiting for an individual Moses to lead us out of the wilderness. If our forefathers had waited for that they would not have got west of the Mississippi. Dynamic individualism, not the static grouping and groping of collectivism, will bring us through.

Individual backbone, courage and action are what we need today. And we need it in industry as much as elsewhere. Backbone to refuse to sell below cost; courage to replace obsolete equipment with better machinery; aggressive action in advertising and selling our products.

Backbones *are* stiffening. Already we can see some signs of better times peeping through the clouds of depression. Economic hardships are bringing back to us our heritage of courage. All that we need now to win through is *action*.

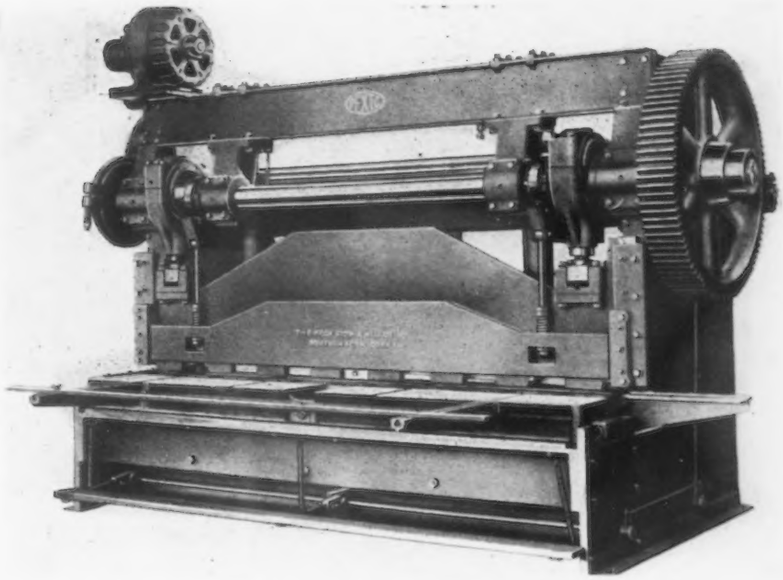
Buying backbone, individually exercised now by the thousands of influential readers of this message, is all of the leadership we need to bring us out of the wilderness. And the most constructive buying, today, is represented in the replacement of obsolescent industrial equipment.

By
JOHN H. VAN DEVENTER
Industrial Consultant
The Iron Age

Copies of this insert may be secured from the Reader Service Department of THE IRON AGE, 239 West 39th Street, New York

Previous recent editorials in this series appeared in the following issues of THE IRON AGE: March 12, March 19, April 9, April 16, April 23, April 30, May 7, May 14, May 21, May 28, June 4, 1931.

New "Pexto" Power Squaring Shears



All parts subject to heavy tension or bending stresses are made of welded steel Cutting capacity ranges from ¼ to ½ in., soft steel.

BOTH welded steel and cast iron members are used in the construction of a new line of over-driven squaring power shears, including the No. 38-120 model illustrated, brought out by the Peck, Stow & Wilcox Co., Southington, Conn. These shears are made in eight sizes capable of cutting various thicknesses of soft steel from ¼ to ½ in. and with nominal cutting lengths of 72 to 168 in. All parts subjected to heavy tension or bending stress are of welded steel; cast iron is used for other parts, thus obtaining advantages claimed for both materials. The company will continue to manufacture cast-iron shears in the smaller sizes.

To assure accurate cutting, a hold-down attachment made of double-webbed welded steel reinforced with tie-rods is operated from the main shaft by two cams having chilled surfaces that contact hardened steel rollers. Compensating springs are provided for shearing various thicknesses and by means of additional heavy springs the hold-down member is counterbalanced.

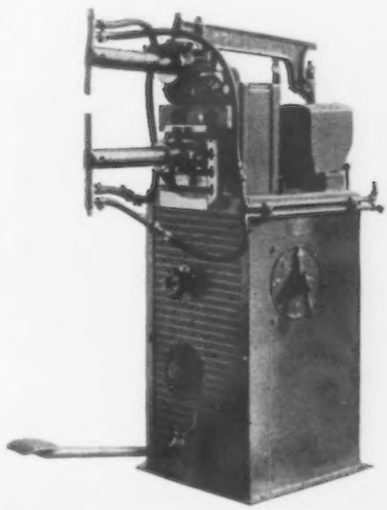
The lower knife chuck is made of semi-steel, reinforced with tie-rods to prevent warping. It rests directly on a heavily ribbed steel bed to absorb the heavy downward pressure. Adjustment of the knife chuck and bed as a unit is possible without disturbing the alinement of the two housing members. T-slots in the top and along the entire front of the knife chuck provide a convenient means for setting gages, extension arms or front brackets.

Heavy compression springs counterbalance the weight of the upper knife bar. The connections are adjustable without blocking the knife holder. In addition, a positive locking device is supplied. Knives of two-piece construction are standard for cutting lengths of 72 in. or more; one-piece knives can be obtained, however. The drive is from a 10 or 15-hp., 1200-r.p.m. motor.

Overall height is 9 ft.; height from floor to top of table, 32 in.; with front and rear brackets floor space required varies from 111 x 139 in. to 111 x 238 in., depending upon the size.

Compact Spot Welder for Foot or Power Operation

THE Joule spot welder, recently brought out by the Federal Machine & Welder Co., Warren, Ohio, is of welded structural steel construction and of simple design. When manually operated, the unit is capable of welding two pieces of 7/32-in. clean machinery steel. Similar steel up to 5/32 in. thick can be handled by the power drive at slow speed. These capacities are with minimum throat and maximum transformer. The unit is especially intended for material from No. 20 to No. 11 gage.



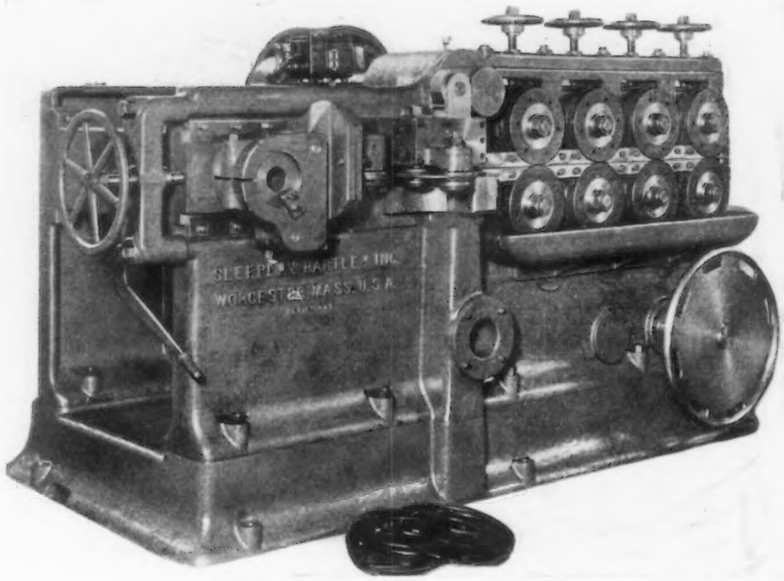
Various throat depths from 10 to 24 in. are obtainable. The entire motor drive is mounted on a special back plate which may be installed without change on any foot-operated machine. Four welding speeds, 60, 90, 120 and 180 welds a minute, are avaliable with the multi-speed motor controlled by a graduated dial and handwheel shown in the accompanying illustration.

A special feature of the transformer design, intended to provide power and efficiency in small space, is that the coils wound on the secondary are of pure "electrolytic" round-edged copper. The fireproof insulation between turns is 0.025-in. thick with sufficient overlap to prevent short circuits. The secondary casting, of boron copper, is designed as a part of the welder trunnions and frame unit.

Although there is no auto coil and the primary is not tapped, accurate control of the secondary is provided by means of an eight-step regulator mounted on the side of the machine. A heavy trip switch at the back of the machine is actuated mechanically and may be timed for various service conditions by means of adjusting nuts.

Both arms are made of hard-drawn copper, 2 in. in diameter. The upper arm is of the swinging fulcrum type. Both points are ⅞ in. in diameter. They are water-cooled and have replaceable tips.

Starting-Gear Blanks Formed Cold from Alloy Steel Strip



The 14-in. rings are made from ⅜ x 1-in. alloy steel strip. A tolerance of only 0.0025 in. is allowed in the outside diameter.

COLD forming of 14-in. rings by coiling edgewise ⅜ x 1-in. "Maxel" tough alloy steel stock is the heavy-duty performed by the machine shown in the accompanying illustrations. Built by Sleeper & Hartley, Inc., Worcester, Mass., the machine operates on the same principle as the company's universal spring coiler; it was designed for the Ford Motor Co. to produce blanks for the flywheel starting gear of models A and AA chassis.

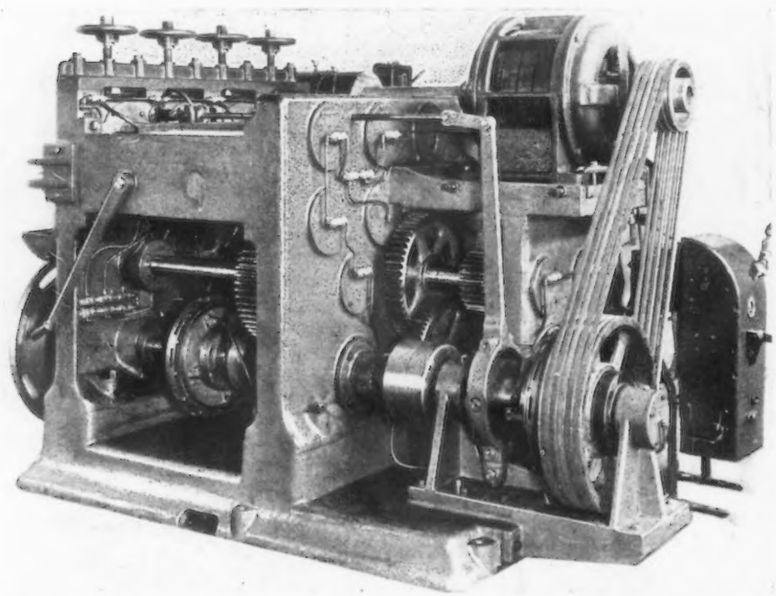
Production of 25 rings a minute can be obtained. In subsequent operations at the Ford plant, the ends of the rings are welded together, the inside edge finished and gear teeth cut on the outer edge. As these are the only machining operations allowed, the forming machine must produce extremely accurate work. The tolerance allowed on the 14-in. outside diameter of the blank is only 0.0025 in.

Gear blanks of this type are usually punched from steel sheets. The coiling process of course prevents waste of stock; another advantage is that the grain of the steel follows the shape of the ring. To obtain these advantages, Ford engineers had improvised a ring forming machine by converting to this service a Sleeper & Hartley No. 5 universal spring coiling machine, originally intended for cold-working oil-tempered wire up to ⅝ in. in diameter. Although this equipment is still in operation, it proved too light to be entirely satisfactory. Accordingly the specialized unit was ordered.

The new machine is massive and powerful. The total weight is 15 tons; base casting and front housing casting alone weigh 6500 and 4800 lb. respectively. The front housing casting carries the feed-rolls and the coiling and cutting-off mechanism. The drive is from a 30 hp., 1200 r.p.m. motor.

Stock is fed from 400-lb. bundles to the ring-coiling mechanism through a series of four pairs of rolls having knurled surfaces to grip the metal. The degree of pressure on the stock is regulated by the handscrews from above. Upon emerging from the feed-rolls the strip encounters a series of deflector rolls which start the bending at the desired curvature. A coiling roll perfects the ring, determining its diameter and roundness. A final deflector roll guides the curved strip to the shear. With the completion of the ring, the feed is automatically brought to a stop by a cam motion which controls clutch and brake. Simultaneously another cam brings the shear drive into action, causing the blade to descend and sever the completed ring. So accurately do forming mechanism and shear operate that the ends of the ring come together in contact, ready for the spot-welder. In the Ford factory the rings will drop from the forming machine to a conveyor which will carry them to an automatic welder and thence on to a machine for finishing the inside diameter. Then they are placed on an arbor for the cutting of the gear teeth on the outer edge.

The automatic action of the ma-



Control and overload clutches are provided on the main driving shaft. A pinion on the main shaft drives the feed rollers.

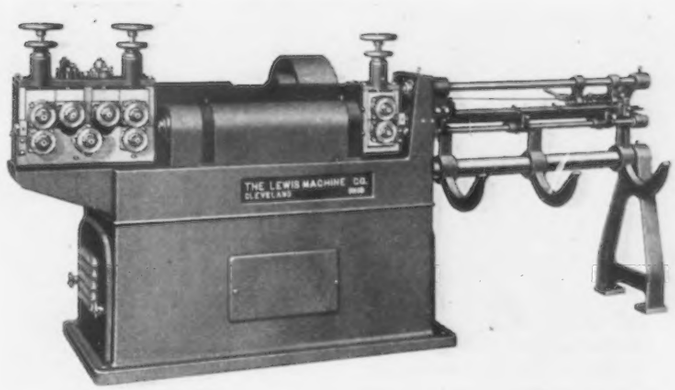
chine is simple. The main driving shaft at the rear is driven by the motor through a control clutch and an over-load clutch. The camshaft drive is through a train of gears from a pinion on the drive shaft next to the over-load clutch. The drive to the feed rollers is from a pinion mounted on a sleeve on the driving shaft. It is engaged and disengaged by a clutch operated from the camshaft. This mechanism also includes a powerful brake, to bring the feed-rolls to a dead stop when the clutch is thrown out. This is necessary because of the use of frictionless bearings throughout the machine. Without the brake, momentum would continue the feed in spite of the great frictional resistance offered by the grip of the rolls on the stock under the pressure brought to bear by the adjusting screws. The large hand-wheel on the side of the machine, patterned after the safety model established by the State of Pennsylvania, is used for manual operation of the machine. It engages and disengages by a push-and-pull action.

Short Operating Cycle

The operating cycle, requiring between two and three seconds, is as follows: The operator throws in the main driving clutch by means of one of the two levers placed at either end of the machine; the feed rolls grip the strip and push it along to the ring-forming mechanism; a ring is formed, the feed comes to a standstill, and the shear descends. On the initial coil it finds nothing to cut off. The shear rises to neutral position, the feed resumes, a second coil forms, and this time the shear has a completed ring to cut off. Thus there is always a formed ring in the machine until the final section of strip is disposed of. The residue end of stock is pushed out with the entrance of the strip from a new bundle.

The shearing motion is powerful; the designers estimate that a pressure of 300 tons is exerted at the blade while cutting. This force is obtained by speed reduction between the camshaft and the cutter-shaft. Hyatt roller bearings are employed in the front feed-roll boxes, Fafnir ball bearings in the coiling rolls and S. K. F. bearings in the rear feed-roll boxes where there is a slight hinge motion.

The machine uses a combination oil and greasing system. The feed-rolls of the lower tier dip into a trough of oil and supply lubricant to the stock for its passage through the coiling mechanism. The coiling and deflector rolls are lubricated from a Nathan oiler, which supplies a shot of oil at these points with every operation of the cutting mechanism. The 36 heavy-duty roller and ball bearings are lubricated by a Trabon greasing system, which requires only a few strokes of a pump at infrequent intervals to keep the bearings adequately supplied.



Improved Automatic Wire Straightener and Cutter

THE No. 8-C automatic wire straightening and cutting machine illustrated, a new product of the Lewis Machine Co., 1600 East Twenty-fourth Street, Cleveland, is provided with a quick-acting cut-off, three-speed transmission, seven-die straightener arbor with variable die spacing for handling a greater variety of wire on one machine, independent adjustment of the straightener rolls, 30 Timken roller bearings and built-in motor drive.

An eccentric on the end of the flywheel shaft operates the cut-off. It is so arranged that the wire is cut the instant the clutch is engaged, thus allowing the wire to continue to feed through the machine during the remainder of the stroke or revolution of the flywheel. This reduces the cut-off time to approximately ⅛ revolution of the flywheel and is said to eliminate all marking or swelling of the wire and to increase the life of the feed rolls.

The three-speed transmission, providing a range of feeds suitable for straightening all kinds of wire, permits reducing the feed without slowing down the straightener arbor. This arbor, seven-die type, is designed to provide variable spacing between three of the dies, a feature increasing the range of wire sizes handled by the machine.

Five straightening rolls in combination with two sets of feed rollers are used in the straightener unit. The two upper or idler straightener rollers have independent adjustment so that they can be set to straighten the wire as it comes from the reel before entering the rotary straightener arbor. This unit allows a fast feed with less offset in the arbor.

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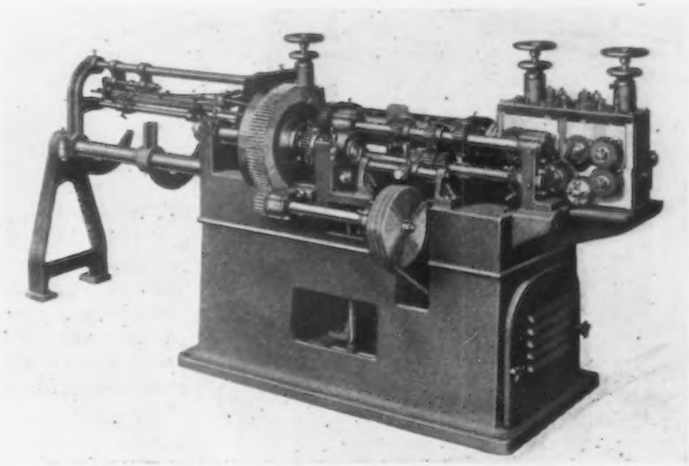
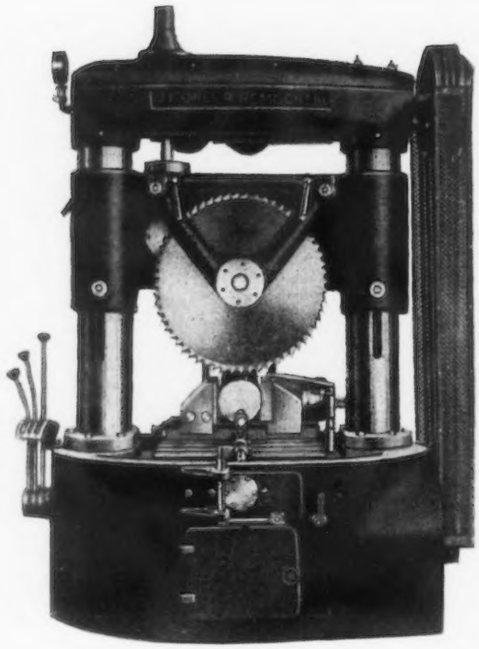
Trade practice rules as approved by the Federal Trade Commission have been sent to some 80 industries or groups for consideration by the latter. The industries are given 60 days in which to accept the rules, after which they will become effective in their revised form.



Quick-action cut-off, three-speed transmission, the seven die straightener arbor and anti-friction bearings are features of this new wire straightener and cutter.

Cutting-Off Saw Features Rapid and Accurate Work



POSITIONING and clamping of the saw is well as feeding of the saw is accomplished hydraulically through the hand levers at the left.

EASE of operation, high capacity and accurate cutting with a minimum of vibration are claimed for the new cutting-off saw illustrated, a new product of the Joh. Friedrich Ohler Saw & Machine Works, Germany, placed on the American market by H. J. Hagen, 109 Lafayette Street, New York. Using a 28½-in. diameter saw blade, 10¾-in. rounds or other sections of comparative size may be handled. Saw blades, 24, 26 and 28 in. in diameter, may be used if desired.

Rigidity is assured not only by heavy construction, but also by mounting the saw blade at the center line of the frame; this position of the saw is intended to minimize side stresses that might tend to distort the frame and cause the cut to run at an angle. The hydraulic work-holding vise is mounted so that the center of the work and the saw spindle are in a vertical line, an arrangement making for rapid cutting as it permits completing a cut with the minimum feed of the saw blade. Furthermore, the resulting horizontal saw cut retains the coolant; it is claimed that the saw teeth do all cutting virtually under water.

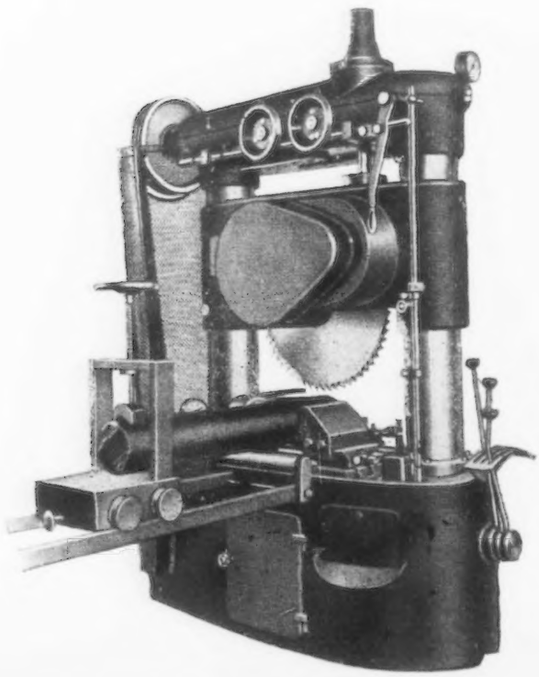
Nine spindle speeds are obtainable through sliding gears located in the cross-piece of the frame and controlled by means of the two handwheels shown. The spur and spiral bevel gears are of hardened chrome-nickel steel and run in oil. All shafts are roller bearing equipped. The drive is through multiple V-belts from a motor in the base. Peripheral speeds of the largest saw blade range in geometrical progression from 43 to 180 ft. per min.

Positioning and clamping of the stock as well as the feeding of the saw is accomplished by hydraulic pressure controlled by means of the three levers at the left-hand side. The end of the piece of stock to be cut is clamped on the small truck, or carriage, that may be seen in the rear view. A hydraulic cylinder and piston are provided for advancing the work to the cutting position. During this motion the cutting feed is interrupted automatically. An adjustable stop at the front of the table determines the length of the pieces cut.

Before cutting begins, the work is securely clamped in a hydraulic vise. For work of unusual shape or for oblique cuts, however, the vise may be removed and the piece of work clamped directly to the T-slots of the table. The chrome-nickel steel screw, for adjusting the vise to accommodate work of various sizes, is provided with both right and left-hand threads so that the work is always clamped under the center of the saw. The clamping force is indicated by a pressure gage and may be adjusted by a regulating valve.

The feed and rapid return of the saw blade are obtained by vertical movement of the head, actuated by hydraulic pressure through cylinders within the two vertical columns. Regulating valves permit fine control of feeds from 0 to 20 in. per min. Fast return up to 80 in. per min. is provided. This, in connection with the automatic feeding of the work along the table between cuts, makes for rapid production.

The hydraulic pump and the coolant pump are located in the base of the machine near the motor. An automotive-type clutch, operated by means of a hand lever, is built into the driving pulley. Specifications include: dimensions of table, 20 x 24 in.; overall height, 7 ft. 3 in.; floor space required, 27½ x 55 in.; approximate weight, 5500 lb.



THE end of the piece to be cut is carried on the small truck, and the work is advanced to the cutting position by hydraulic means. During this motion the cutting feed is interrupted automatically.

A PRACTICAL APPROACH TO MACHINE REPLACEMENT

IN almost every discussion of the ills of modern industry, attentive readers and listeners will note the words, "Machine Obsolescence." Expert economists have estimated the tremendous waste incurred by this condition, yet with few exceptions there have been no definite suggestions of means for avoiding the burden, nor even to determine the exact extent to which the condition exists. While mere age is not always proof that a machine is inferior to present-day models, it is wise to consider that natural progress and improvement has always played an important part in the success of American industries. Obviously, the logical procedure would be to determine all the factors that enter into the valuation of any particular machine.

It is with this thought in mind that the Union Special Machine Co., Chicago, makes public the system that is used in its own factory, believing that the same methods can be applied advantageously by members of the trades for the betterment of their mechanical equipment. By this system each individual machine or each individual group of machines is provided with a complete pedigree which coordinates all of the factors having a bearing on the determination of the degree to which obsolescence exists.

Based on observation of the system under actual operating conditions, the benefits derived are the natural result of the favorable conditions automatically produced in adhering to the prescribed procedure. The most important of these may be listed in five principal classifications as follows:

Advantages of the System

1. The time for taking inventories is reduced, and, in fact, machine operation need not be interrupted at all during these periods.

2. Attention is constantly directed toward each individual machine. Thus wasteful and inefficient units are quickly detected and exposed, with the evidence of their faulty performance prepared in a form suitable for presentation to those in authority.

3. By this method of directing attention to the mechanical equipment, officials of the operating department are automatically forced to keep in touch with all new developments and improvements in methods.

4. The ordering of replacements and repairs is facilitated, and minimum time is wasted by machines idle during operating time.

5. The financial operations of the company are safeguarded through maintaining a constant balance of the appropriations for new equipment and, as a result, by avoiding unexpected expenditures.

The chief essential of the system is a machine equipment record card of a form recently copyrighted by the Union Special Machine Co. This card provides for the listing of the name of the manufacturer of the machine, and also the serial numbers of duplicate machines where a group is involved. Following it is an itemized list of the factors that should be considered arranged in a form that facilitates recording the results obtained through periodic surveys. These are as follows: Date of Survey, General Condition of Machine (good, fair or poor), Date of Purchase, Purchase Cost, Per Cent of Production the machine is capable of maintaining as compared with the latest type of equipment, Quality of Work (excellent, good or fair), Type Designation of the newest machine. In detail the condition of the machine is classified as to whether it must be changed and the estimated cost of change, whether it must be repaired and the estimated cost of repair, whether it must be overhauled, cost of overhauling, and the date recommended for overhauling.

Four Classifications Define Urgency

On the basis of the above information the machine is then allotted to one of four classifications, of which Class A denotes machine equipment which for adequate reasons should be replaced with a better machine, Class B the same as A except that the urgency for replacement is not so great, Class C covers equipment where specific recommendations should be made after Class A and B machines have been replaced, and Class D denotes that the equipment now in use is found to be the best obtainable for its particular function. By the law of engineering progress the class letter of a machine will ordinarily bear a definite relation to the actual age of the machine.

At this point it will be seen that there are a number of other factors that must enter into the decision as to the final disposition of the recommenda-

Mach. Mfd. By
Operation
Type Serial No.

MACHINE EQUIPMENT RECORD

Dept No.

Serial Nos. Of Duplicate Machines Involved

* ☐ Class A ☐ Class B ☐ Class C ☐ Class D

Date Of Survey	General Condition Of Machine Good Fair Poor	Date Of Purchase	Purchase Cost	% Production Compared To New Type	Quality Of Work Excel Good Fair	Type Of New Machine	Condition Of Machine: Must Be Changed	Cost Of Change	Must Be Repaired	Cost Of Repair	Must Be Overhauled	Date Required	Cost Of Overhaul

Computation Of Replacement Cost			Remarks
A = Cost Of Improved Machine			
B = Resale Or Trade-In Value			
C = Cost Of Change-Over			
D = Cost Of Repairs			
E = Cost Of Overhauling			
F = Net Cost. F = A − (B + C + D + E)			

Economies Effected			Remarks
Number Improved Type Required			
Increase In Production %			
Saving In Floor Space − Sq. Ft. X Cost Per Ft.			
Saving In Maintenance			
Saving In Labor Cost			
Net Saving			

Replacement Or Addition?
Is New Machine Recommended?
REMARKS

* NOTE

Class "A" Denotes Machine Equipment Which For Adequate Reasons Should Be Replaced With A Better Machine

Class "B" Same As "A" Except Urgency For Replacement Is Not So Great

Class "C" Covers Equipment Where Specific Recommendation For Replacement Should Be Made After Class "A" & "B" Machines Have Been Replaced

Class "D" Denotes That Equipment Now In Use Is Found To Be The Best Obtainable For Our Particular Work

NOTE

Card To Be Made Out For Each Individual Machine Or For Each Individual Group Of Machines

FORM ON COPYRIGHTED 1931 UNION SPECIAL MACHINE CO.

Machine equipment record card for gaging obsolescence.

DATA ON VARIOUS NEW EQUIPMENT UNDER CONSIDERATION

MAKE & TYPE MACHINE	DATA	DATE
MAKE & TYPE MACHINE	DATA	DATE
MAKE & TYPE MACHINE	DATA	DATE
MAKE & TYPE MACHINE	DATA	DATE
MAKE & TYPE MACHINE	DATA	DATE

REMARKS

PRINTED IN U. S. A.

Comparisons of alternative equipment on reverse side of card.

tions. For convenience these are itemized in compact form under the heads of A—Cost of Improved Machine, B—Resale or Trade-in Value of Old Machine, C—Cost of Change-over, D—Cost of Repairs, E—Cost of Overhauling, and F—The Net Cost of the Improved Machine. The net cost is computed as F = A—(B—C, or D, or E). This means that the computation of the actual cost of a new machine should allow for the resale value of the old machine, plus the cost of reconditioning the old machine so that it would continue to operate.

To complete the information required in determining what recommendations will be made, it is necessary to sum up the economies that can be effected with the improved type of equipment. This lists the number of new machines required, the increase in production made possible, the saving in floor space, saving in maintenance, and the saving in labor costs (operation). The conclusions that can be drawn from a comparison of cost and savings are so self-evident as to enable anyone to render an intelligent and justifiable decision on any question of this type.

Arrangements have been made whereby any manufacturer can obtain a supply of cards at cost by addressing the Union Special Machine Co., 400 North Franklin Street, Chicago.

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Awards Announced for Beautiful Bridges

The Washington Avenue bridge in Chicago and the Delton bridge in Sauk County, Wis., have been judged to be the most beautiful steel bridges of their classes built in 1930 in the United States and Canada. They will consequently be decorated this fall with bronze plaques by the American Institute of Steel Construction. A jury of leading architects and engineers, acting for the institute, has just announced its decision.

The Washington Avenue bridge is a bascule bridge over the Chicago River, which cost $1,750,000 and is owned by the Department of Public Works of Chicago. It was designed by Thomas G. Pihlfeldt, engineer of bridges, and fabricated by the American Bridge Co. The bridge span is 239 ft., and the roadway 90 ft. wide. It was selected by the jury as a most pleasing solution of a most difficult bridge design problem. The award was made in that class of large bridges costing over $1,000,000 to erect, of which there were a number during the past calendar year. Honorable mention in this class was given to the Mid-Hudson bridge at Poughkeepsie, N. Y., a suspension bridge designed by Ralph Modjeski and Daniel Moran for the State of New York, and likewise erected by the American Bridge Co. Second honorable mention was awarded to the Montreal Harbor bridge fabricated by the Dominion Bridge Co., Ltd., for the harbor commissioners of Montreal. This is a cantilever bridge designed by Monsarrat & Pratley, Montreal.

The jury exercised its prerogative in deciding not to make awards in Class B because no entrant of sufficient merit was recorded. This class included bridges costing between $500,000 and $1,000,000 to erect. Of those bridges costing less than $500,000, grouped in Class C, the steel arch highway bridge at Delton, Sauk County, Wis., was selected as the most beautiful. This bridge cost approximately $54,000. It was designed by the Wisconsin State Highway Commission and fabricated by the Lakeside Bridge & Steel Co. It is an arch bridge having two spans of 218 ft., 10 in. each, and carrying a roadway 27 ft. wide. Honorable mention in this class was awarded to the Lachine bridge across the Lachine Canal at Eighteenth Avenue, Lachine, Canada. This bridge cost but $3100 to erect. It was designed by R. Dorion, city engineer, and fabricated by the Dominion Bridge Co., Ltd. The bridge is but 47 ft. in span and has a roadway of 14 ft. clear with two sidewalks.

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Construction Gains in Some Districts

Though the general trend of construction still appears to be downward, there are important local exceptions, according to the latest statistical survey of the F. W. Dodge Corpn., New York, based on figures for May.

In seven of the 13 territories comprising the 37 States east of the Rocky Mountains there were forward movements in May. When contrasted with May of last year, records for seven territories show improvement in one or more of three major construction classes—residential, non-residential and public works and utilities. The metropolitan area of New York was alone in reporting a gain over May, 1930, in residential contracts. Three districts—upper New York State, Kansas City, Mo., and Texas—produced gains in non-residential building over May of last year. In public works and utilities, five districts had gains over May, 1930; they were the Middle Atlantic, Pittsburgh, Central Northwest, Kansas City and Texas territories.

The total in new construction contracts during the month was $306,079,100. Public works and utilities, with $108,948,400, took a slight lead over non-residential building, which amounted to $108,231,100. Residential building totaled $88,899,600 in the 37 States east of the Rocky Mountains.

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Canadian Furnace on Low Phosphorus Iron

BUFFALO, June 12.—The Port Colborne Furnace Co., Port Colborne, Ont., is in operation for a limited run on spiegeleisen and low phosphorus pig iron. Hickman, Williams & Co. are acting as sales agents.

NEWS — A RAPID SURVEY OF THE WEEK'S EVENTS

VOLUME PROFITS

COSTS and prices established at prosperity level of volumes do not permit of profitable operation during periods of decreased demand. Industry begins to see the error of taking the abnormal as a normal. One prominent automobile company, realizing this, is holding regional meetings of its dealers to get them to adjust administrative and sales expense to present volumes and show a profit. It is good business to base plans on actualities, not on hopes.

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STANDARDIZATION

NOT so long ago, standardization was said to be the great blessing of industry. Now Charles F. Kettering, of General Motors, says that "the standardization of ideas is the industry's greatest curse." The trouble is, according to Mr. Kettering, that the standardization of parts and operations has been carried over into the standardization of design. All cars look more or less alike and hence there is little to whet one's desire to buy a new car.

Can it be that automobiles are now so highly perfected as to leave no room for functional improvements that might serve as better appetite whetters than style changes?

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HOPEFUL

"THAT there is evidence of a very pronounced improvement in the mental attitude of people, generally speaking, and particularly those affiliated with and dependent upon the steel industry for their source of raw materials, is an indisputable fact," said Laurence F. Miller, vice-president in charge of sales of the Granite City Steel Co., Granite City, Ill.

"Especially is this true of the steel producers themselves. We find the consensus of opinion is that the bottom has been reached and the next change will be upward."

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UP AND DOWN

RAILROAD freight rates may undergo considerable realinement, both upward and downward, if the carriers' proposals meet with official approbation. For while application has been made for a general rise of approximately 15 per cent in rates throughout the country, the Central Freight Association and Trunk Line Association have also made application for a reduction of short-haul rates on iron and steel. The proposed reductions range from a 50 per cent cut on a haul of five miles or less to a 3 per cent reduction on from 85 to 90 miles.

Motor truck competition on short hauls is responsible for this attempt at short-haul rate reduction. The question arises as to how far the competitive range of motor trucks would be increased by the proposed 15 per cent general freight increase, and how much long-haul freight would be diverted to water carriers. Competition exercises more authority than do commissions.

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TAG DAY

AT the recent meeting of the Associated Machine Tool Dealers, it was suggested that the tagging of obsolete machines in our manufacturing plants would be an excellent first step toward intelligent replacement. Somewhat akin to this is the system described on page 1993 of this issue, which involves the keeping of a card record from the obsolescence viewpoint. Particularly valuable is the practice involved of noting on the back of each card the advantages of available competing machines. Unless one knows the machines that are *not* in his plant he cannot gage the value of those that *are* in it.

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WAGE STUDY

AN interesting survey of employers action with regard to current wage rates has been completed by the Charles E. Bedaux Co., New York. Covering companies in the United States and Canada, representing 34 different lines, it discloses that 58 per cent have made no reductions to date, but that 42 per cent have cut salaries and wages by an average of 10 per cent.

In commenting on the survey, the president of the Bedaux company points out that wage reductions today have much more serious economic consequences than formerly, due to the increased importance of the wage earner as a consumer. "This does not mean that overpaid trades should not be reduced. But the pay envelope cannot be destroyed without destroying business."

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NEARLY OVER

A PROMINENT "captain of industry" who is not given to overoptimism, declares that this depression is 80 per cent over from the physical standpoint and 60 per cent over from the mental standpoint. When will we learn that "long faces" mean the perpetuation of short pocketbooks?"

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Also in This Issue—

U. S. Steel Unfilled Orders Decline

May Construction Gains in Seven Territories

Slow Seasonal Decline in Motor Cars

Meeting of Blast Furnace Association

International Harvester Places Large Tool Order

Decline in April Factory Earnings

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Plea for Higher Freight Rates Will Receive Early Attention

Interstate Commerce Commission Expected to Act Fairly Soon on Appeal from Railroads

WASHINGTON, June 16.—Action by the Interstate Commerce Commission on the proposal of the railroads of the country for a maximum increase of 15 per cent in freight rates and terminal or switching charges can be only problematical at this time. It has been indicated, however, that the commission will give early attention to the joint application of the carriers for the increase.

Manifestly, the commission is aware that their revenues have slumped to a point where the yield is but little in excess of 2 per cent on investment, and that this condition has caused the railroads to ask for "emergency treatment." They are hoping to increase revenues on an average of about 10 per cent, which, it is estimated, would develop $400,000,000 in revenue.

The 15 per cent increase, it is realized, could not be applied generally to all commodities. Careful attention apparently is being paid to the possible effect on traffic diversion to competing carriers, such as motor trucks, waterways and pipe lines, should undue increases be made in products accessible to ready movement by competitive channels of transportation. Therefore, it is assumed that, should the railroads be granted increases, following hearing on the petition, supplementary schedules would be filed fixing uniform increases on given commodities, but carrying varying percentages for different lines. This, it has been pointed out, would expedite the increases because it would avoid the necessity of preparing entirely new tariffs, a tremendous task that would require a great deal of time. Moreover, it would leave rate relationships undisturbed.

Commission Represented as Being "Sympathetic" to Plea

The railroads have expressed the hope that the Interstate Commerce Commission, as well as the State commission, would reach final action within three months. Doubt exists that this can be done. While the Interstate Commerce Commission and, apparently, the State commissions, also, can conduct hearings during the summer months, the scope of the inquiry is so broad that it is not believed that the Federal commission at least can reach final conclusions before late fall at the earliest date.

The commission is represented as being "sympathetic" toward the proposal of the railroads, but it does not follow, it has been declared, that it will be agreeable to a general increase in rates. Nor does it follow that the 11 members will be unanimous in their findings. On the contrary, such unanimity of view would be most unusual in a proceeding of the kind.

It is probable that the attitude of shippers generally will be an important factor in guiding the commission. The railroads claim shippers whom they have consulted have agreed that a stimulus to railroad credit at this time would be of benefit in relieving the business depression. The inference is that the increase would restore the purchasing power of the carriers and consequently set up an important buying movement. On the other hand, it is claimed that some shippers, while favorable to an increase in rail rates, are of the opinion that unless carefully adjusted they would deprive the railroads of some traffic they now have and throw it to competitive lines of transportation. It is also thought the hearings will develop protests against increases on the ground that industry, like the railroads, is operating on thin margins or at actual losses, and is unable to pay higher freight rates. It is known that executives of some railroads, particularly in the West, have questioned the advisability of seeking increased rates in view of the depression.

Criticisms Leveled at Railroads for Alleged Wasteful Practices

Likewise, criticism has been directed at the carriers for wasteful practices, though the charge is stoutly denied and the claim made that they have put into effect all possible methods of efficiency under prevailing conditions. The carriers also have pointed out that, despite their financial embarrassment, they are maintaining wage rates, so strongly insisted upon by the Hoover Administration. One criticism made is that the carriers have not coordinated traffic movement as much as they could. It has been urged that these apply to terminal arrangements, joint traffic, and cooperation with other lines of transportation. Better coordination, it has been suggested, would reduce costs. This view has led to speculation as to the possibility of the commission proposing remedies in this direction and of speeding up plans for consolidation of the railroads into four or five systems.

Another criticism directed at the railroads is that they have unnecessarily cut both freight and passenger rates to meet competition from other forms of transportation. On the other hand, the commission has approved such reductions in a number of cases, especially for the purpose of meeting motor truck and bus competition. Southern railroads recently, however, were criticized for attempting to slash rates on cast iron pipe and fittings from Southern points to Gulf and Atlantic ports for coastwise movement to North Atlantic ports. The commission ordered the schedules canceled. Commissioner Lewis pointed to the fact that carriers are asserting that increases in rates all over the country are necessary and said that in the face of such declaration, the proposal to cut the rates on cast iron pipe and fittings "seems incongruous."

It is the position of the carriers that their earnings are so low that they have reached the danger point and that they are threatened with defaults of interest and receiverships. They contend that if rates had been maintained at the levels existing some eight years ago, they would not be in their present situation and would not have had to petition for increased rates.

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Photoelectric Device Tests Sheet Surfaces

A DEVICE for comparing sheets for smoothness has been described by E. Gerold (*Stahl und Eisen*, Jan. 22, 1931). A system of lenses in a lightproof case directs a beam of parallel light upon the surface of the metal under test. According to the perfection of the surface, the reflected light is concentrated on the photoelectric tube, which in turn actuates a galvanometer. A surface polished with 00 emery paper produced a deflection of 38 units on the galvanometer, while after polishing with 0000 paper the deflection increased to 54.

It is essential that the light source remain constant. A 12-volt lamp, burning 2.5 amp., was found satisfactory. Sections 1½ in. in diameter could be examined at each exposure. On account of the large number of tests required, the method is unsuitable for examining sheets in quantity. It can be applied satisfactorily on account of its sensitiveness to studying the effect of surface quality on the adherence of colored coatings.

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Ryerson Company Buys Milwaukee Warehouse

With the purchase of all of the stock of the Reed-Smith Co. of Milwaukee, Joseph T. Ryerson & Son, Inc., has expanded its warehouse distributing service to 10 localities throughout the United States. The Ryerson company bought an interest in the Reed-Smith Co. in 1924, but now has acquired all of the stock. The business will be known as the Reed-Smith plant of Joseph T. Ryerson & Son, Inc., of Wisconsin.

Railroads Ask Permission to Reduce Short-Haul Steel Rates

Petition Interstate Commerce Commission for Scale Corresponding With That Ordered by Pennsylvania Commission

WASHINGTON, June 16.—Reduced rates on manufactured iron and steel products for hauls 100 miles and less throughout most of Official Classification territory have been formally asked of the Interstate Commerce Commission by the railroads. New England and Illinois Freight Association territories are not included. It has not been indicated whether these two territories will be added to the affected area. New England territory includes all of that section of the country. Illinois Freight territory includes all of Illinois, except that embraced in the Chicago district. It also takes in points on the west bank of the Mississippi River and southern Wisconsin and, therefore, includes St. Louis and Milwaukee. Railroads are seeking to have the rates lowered on one day's notice or not later than July 1 to the level of those which, after two postponements, went into effect in Pennsylvania on June 10. The latter were the outgrowth of an order by the Pennsylvania Public Service Commission, which held that the short-haul rates set up by the Federal commission in the general (Hoch-Smith) iron and steel mileage scale were unreasonable.

The Pennsylvania commission's action followed some 40 complaints directed against the Interstate Commerce Commission's scale by Pennsylvania steelmakers, particularly those in the Pittsburgh district. Low short-haul rates are vitally important to that district, where tremendous tonnages move with nine miles the longest haul under switching rates. In contrast, 80 miles is the maximum haul in the Chicago district.

The Pennsylvania scale begins at 3c. a 100 lb. for hauls of five miles and under, against the Hoch-Smith rate of 6c. Sharp reductions continue through the scale until the greater distances are approached, and at 95 miles both scales take a rate of 15¼c. The carriers now are seeking to apply to most of Official Classification territory the same scale as that put into effect in Pennsylvania. This is urged as a necessity in order to place steel producers in other sections on an unchanged competitive basis with Pennsylvania manufacturers, to retain rate relationships, and to prevent further diversion of steel traffic to water lines and motor trucks.

The original effort to apply the Pennsylvania short-haul scale throughout the remainder of Official Classification territory was made by the Central Freight Association and Trunk Line Association carriers late in March. Hearings on the proposal were held in Pittsburgh on April 1. Opposition coming from steel company traffic officials was directed against application of mileage scales in switching districts. It was said that to do so would disrupt established rate relationships. No protest was made against the reduced short-haul rates themselves or to their extension throughout the entire territory affected, in which is situated approximately 90 per cent of the steel-making capacity of the country. The steel manufacturers and railroads ended the hearing in Pittsburgh without reaching an agreement. The situation was complicated because other States, including Illinois and Indiana, had also suspended the Interstate Commerce Commission short-haul rates.

After giving further study to the question, the Central Freight Association and Trunk Line Association carriers determined to attempt general adoption of the short-haul rates by means of formal application to the Interstate Commerce Commission. It was filed last Saturday under what is known as the sixth section of the act to regulate commerce. Under this section, request for application of rates sought is made where it is desired to establish the rates upon less than the usual 30 days' time.

Reductions Sought Coincide with Request for General Advance

It is an interesting coincidence, and perhaps nothing more, that the railroads are asking to reduce short-haul rates on iron and steel at the precise time they are seeking a general advance of 15 per cent in rates throughout the country. The carriers apparently have been forced to take this seemingly inconsistent step in view of the action of the Pennsylvania commission and similar prospective action by other States, and also by reason of the threat of greater diversion of short-haul steel traffic to competitive transporting lines.

The effort of the carriers for a general lowering of short-haul steel rates is taken to mean that no attempt will be made to advance rates on such traffic should the Interstate Commerce Commission grant the railroads' request for an increase in rates for which they are now petitioning. A similar assumption applies to short-haul rates on other commodities which readily lend themselves to transportation by other channels.

The proposed short-haul rates on iron and steel would cover the entire range of products embraced in the Hoch-Smith case. They would not affect cast iron pipe and fittings.

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Reduced Short-Haul Iron and Steel Rates Carriers Seek for All of Official Classification Territory

(Rates in Cents per 100 Lb.)

	Proposed	Present
5 miles and under	3	6
10 miles and over 5	3¾	6½
15 miles and over 10	4½	7
20 miles and over 15	5¼	8
25 miles and over 20	6	8½
30 miles and over 25	6½	9
35 miles and over 30	7¼	9½
40 miles and over 35	8	10
45 miles and over 40	8½	10½
50 miles and over 45	9¼	11
55 miles and over 50	10	11½
60 miles and over 55	10½	12
65 miles and over 60	11¼	12½
70 miles and over 65	12	13
75 miles and over 70	12½	13½
80 miles and over 75	13¼	14
85 miles and over 80	14	14½
90 miles and over 85	14½	15
95 miles and over 90	15¼	15¼
100 miles and over 95	16	16

Norton Co. to Acquire Behr-Manning Corpn.

A consolidation of the Norton Co., Worcester, Mass., manufacturer of abrasives and grinding machines, and the Behr-Manning Corpn., Troy, N. Y., manufacturer of sand paper and kindred products, is nearing completion. The merger will be effected by an exchange of stock.

Plants of the two companies will be operated separately under present names and managements. Aldus C. Higgins, treasurer, and William La Coste Neilson, vice-president, of the Norton Co., will become members of the board of the Behr-Manning Corpn., and John A. Manning, president, and Frank E. Gallagher, vice-president and general manager, of the Behr-Manning Corpn., will become members of the Norton board.

The plan calls for a change in the capital structure of the Norton Co., which will serve as the holding company for the two merging units. The present capitalization is $18,000,000 in shares of $100 par value. This will be increased to $23,000,000, all of which will be of $10 par value. Of the new shares, $22,315,130 will be issued immediately. Stock of par value of about $4,500,000 will be exchanged for the shares of the Behr-Manning Corpn.

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The Hoist and Crane Division of Robbins & Myers, Inc., Springfield, Ohio, has appointed Dravo-Doyle Co., Dravo Building, Pittsburgh, exclusive representative for the sale of Robbins & Myers hand and electric hoists, cranes, and trolleys in Pittsburgh territory.

Survey Discloses Facts and Opinions on Wage Cuts

Reporting Companies Voice Varied Opinions—Wages Are Greater Economic Factor Than in Past, According to One View

A SURVEY of companies representing 34 different lines of manufacture in the United States and Canada discloses that 58 per cent have neither reduced salaries nor wages because of the depression, states the Charles E. Bedaux Co. of New York, Inc., engineer, which sent out the questionnaires. The industries covered were varied, ranging from steel products and automotive parts to corsets and celluloid products. Companies that reduced salaries and wages comprised 24 per cent of the total number of establishments reporting, while those which reduced salaries only represented 15 per cent and those which cut wages only, 3 per cent.

Salary reductions in most cases amounted to 10 per cent, and wage cuts averaged 10 per cent, although the smallest was 5 per cent and the largest 23 per cent.

Where neither wages nor salaries have been reduced, the answer in the great majority of cases was, "None made and none contemplated."

Excerpts from Answers

Among the contrasting opinions expressed in the answers to the questionnaire are the following:

"My observation is that the agitation for cut in wages comes, not from manufacturers, but from bankers and theoretical economists."

"It seems to the writer that, whereas a year ago we were paying 55c. a lb. for butter now 27c., eggs 50c. a dozen now 25c., bread 10c. a loaf now 5c. or 6c., and so on down the line with all commodities, and if reductions in labor are not put into effect, then it is equivalent to giving a man a raise if he is kept at his old rate."

"It seems essential that the present standard of living be maintained and, inasmuch as the cost of living has gone down, the cost of labor should go down proportionately, thereby maintaining balance."

"We have made no wage reductions for the reason that any reductions possible in wages would not reflect themselves to any great extent in our sales prices, our payroll being approximately 20 per cent, so that a 10 per cent or 20 per cent cut in wages would not have any great bearing on the prices we must get for our product."

"We do not contemplate any wage reduction. On the other hand, wages seem out of proportion in the building trades and, if there could be some regulation here, perhaps this would stimulate building tremendously. Building, as you know, is what led us out of the depression of 1921."

"Wage reductions might help somewhat on the 15 per cent of our country's volume which is exported, but they would delay recovery progress on the 85 per cent of our country's production which is consumed at home."

"Because of the fact that most of the European countries have reduced wages and are underselling domestic products even with a high tariff, there is a question in my mind as to how long we can continue with the wide differential that now exists. Also, if the cost of living remains where it now is, the standard of living would not have to be reduced even with a 10 per cent wage cut."

"We feel that keen management will find many ways to maintain profits, even during depression, without reducing wage rates. This, of course, is tantamount, in the face of reduced living costs, to an increase in wages, and I do not believe that any more effective answer to communistic and socialistic doctrines could possibly be advanced."

"We have made no cuts, but the way wages are being cut by others over the country, it is our opinion that the corporation that does not believe in it may eventually be forced to do it."

"It is our belief that neither at this time nor at any other time is it necessary to reduce wages in order to effect satisfactory economic conditions; for the reduction in the cost of producing is unquestionably offset by the diminution of the purchasing power of the country, so that what industry saves on labor is in the aggregate lost through curtailment of sales possibility."

Comment on the Survey

In commenting on the survey, Douglas S. Keogh, president of the Bedaux company, pointed out that wage reductions have much more serious consequences than they had before.

"The so-called machine age," declared Mr. Keogh, "has brought about one major change in economics. In the old days the workman was primarily important as a producer. His volume was small. It could be and was consumed by the so-called middle and upper classes.

"Today, in conjunction with the machine, his production is too great to be consumed by any one class. He must make enough money to be able to buy back part of his own product and that of his fellow workers. To do this he must be well paid.

"To sum up, wages must be maintained. The pay envelope cannot be destroyed without destroying business. This does not mean that certain overpaid trades should not be reduced, or that service bonuses, etc., which have never accomplished what they were intended for, should not be discontinued, or that adjustment to an equitable basis should not be made where wage scales have got out of line as a direct result of the war or the carelessness that seems to go hand in hand with good times."

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Blast Furnace and Coke Men Hold Meeting

Performance data on special checker stoves, comparative performance in hot metal ladles and beneficiation of iron ores formed the principal topics of discussion of the blast furnace section at a meeting of the Eastern States Blast Furnace and Coke Oven Association held recently at the Wildwood Country Club, Pittsburgh. Harry Saxer, superintendent of blast furnaces and coke works, Jones & Laughlin Steel Corpn., Aliquippa, Pa., presided at this meeting, and C. P. Clingerman, superintendent of blast furnaces, Mingo Junction, Ohio, works, Carnegie Steel Co., led the discussion on beneficiation of ores.

In the coke oven section late developments in distillation of light oils led the program, including the washing of such oils. The phenol recovery system was reviewed, with emphasis on the method used at the Lorain, Ohio, works of the National Tube Co. Discussion of methods for disposal of surplus coke oven gas was carried on, but most of the members reported the gas as being used for melting and heating in mills of which coke ovens are a part.

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Allis-Chalmers Will Buy American Brown-Boveri

Directors of Allis-Chalmers Mfg. Co., Milwaukee, have approved purchase of the assets of American Brown-Boveri Co., the electrical subsidiary of the American Brown-Boveri Electric Corpn., and the capital stock of the Condit Electrical Mfg. Corpn., as well as the electrical patents and other electrical assets of American Brown-Boveri. Terms of the purchase provide for the issuance of approximately 62,000 shares of Allis-Chalmers capital stock and the payment of $600,000 in cash. Directors of Allis-Chalmers have the power to consummate this deal without recourse to a vote of the stockholders.

Railroads Say Remedy Lies in Rate Rise, Not Wage Reduction

Petition for Advance in Transportation Charges Cites Delays That Would Result in Labor Deflation

THE petition of the railroads for a freight rate increase of about 15 per cent was filed with the Interstate Commerce Commission Wednesday morning. The petition follows in part:

"In connection with efficiency and economy of operation the question may be raised whether railway wages are reasonable under existing conditions. For the determination of wages of railway labor there is a procedure prescribed by Federal law. This procedure involves, in the case of a dispute, three possible steps, the last of which is alternative: first, conferences between the railway managements and the representatives of railway labor; second, the intervention of boards of mediation in the event the conferences result in disagreement; third, arbitration in the event the two preceding steps fail; or, if either party refuses to arbitrate, a finding of facts by a commission appointed by the President.

"The issues presented in each of these steps are of great importance and the economic facts necessary for their determination are not easy to assemble and consider. It would be a reasonable prediction to say that if the railway managements were now to initiate reductions in rates of pay affecting all classes of railway employees covered by existing agreements, the proceedings would have to pass through the first two and one or the other of the third stages.

"There are at least eight important classes of railway employees. A conclusion of proceedings affecting all classes of railroad employees could not be expected within a period which would enable the result to be taken into consideration in the present emergency.

"Concerning the wisdom of initiating such a controversy at this time, it is assumed that there will be no substantial difference of opinion. The policy of the Federal Government, concurred in by the managements of most leading industries, is that the revival of industry and commerce should be predicated, for the time being at least, upon the maintenance of existing wage scales.

Would Defer Consideration

"Because of this policy and because of the fact that even in the absence of such a policy the question of railway wages would require a long period for its disposal, and because the condition of these carriers does not admit of such prolonged delay in the provision of a remedy, the managements of these carriers have not seriously considered at this time initiating controversies looking to the determination of the reasonableness of railway wages. They have concluded that, if that question must be met and dealt with, it must be at a later stage.

"If the carriers were permitted to participate in periods of prosperity equally with other business, they should equally sacrifice in periods of adversity. But they are denied such participation by law. Even in periods of prosperity the return on railway capital has been meager and inadequate as shown by the statistics of net railway operating income and its percentage of the value of railway property.

"During the recent period of great prosperity, when industry was reaping unprecedented rewards, the carriers contributed a service indispensable to the creation of this prosperity. The compensation for this service offered by law has been a return on capital only slightly exceeding the rate of interest which the ordinary investor receives when he invests in well secured obligations. This has been the upper limit of the reward of risk of railway capital and of efficiency of railway management.

"The actual return has been, during the years 1921 to 1930, inclusive, for the Class I carriers of the United States, an amount of net railway operating income about two billion five hundred and seventy-five million dollars less than the amount which would have been obtained had the rate of return on the capital employed prescribed by the law been realized.

"Obligation" to Preserve Property

"The theory of the law is that railway property is private property affected with a public use; that in being devoted to such use it foregoes exceptional opportunity for the assurance of fair return. If the sacrifice already made under conditions of prosperity is to be greatly enlarged because of conditions of adversity, the result is that railway property has become public property affected with a private obligation to maintain it. It cannot be expected that investors in railway securities will assume and perform such an obligation."

The railroads dismiss the idea of increasing passenger rates as impracticable. Discussing the subject of motor truck competition, the brief concludes that "no program dealing comprehensively with this feature of the situation can be worked out now. It is very probable that no comprehensive program affecting all traffic competitive with other forms of transportation can be worked out at any one time in the future; and that, on the contrary, particular descriptions of traffic will have to be taken up from time to time. . . .

"Since passenger traffic is not available for further increase, the entire increase should be placed on freight traffic. Relief cannot be secured in time to meet the emergency by proposals for adjustments of freight rates which seek to determine the effect of competition of other forms of freight transportation. All freight traffic should be subjected uniformly to such increase with certain adjustments which do not affect the principle involved."

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Dolomite, Inc., Cleveland, operating a plant at Maple Grove, Ohio, and Basic Products Co., Pittsburgh, operating two dolomite plants near Tiffin, Ohio, have been consolidated under the name of Basic Dolomite, Inc. The Dolomite management is retained in the new company with Howard P. Eells president and Dan. P. Eells, both of Cleveland, chairman of the executive committee. George Davison, Allan F. Davison and Albert P. Myers, former Basic company officials, the chairman of the board, vice-president and member of the executive committee respectively.

OFF THE ASSEMBLY LINE

Motor Car Production and Sales in a Slow Seasonal Decline

DETROIT, June 15.

AUTOMOBILE production has been declining since the last week of May, and there is little hope that the downward seasonal trend will be arrested this month. There are several exceptions, notably Chevrolet, where schedules set at the beginning of June have been revised upward to keep operations attuned to sales demands. The tenseness caused by the downward plunge of stocks last month has eased somewhat, now that the stock market is firmer, and automobile executives, as well as those dependent on the motor car industry for business, seem less pessimistic, despite the prospects for a lean summer. The better sentiment apparently is attributable to the fact that local industry and its suppliers have become reconciled to a bad situation and intend to make the best of it.

Retail sales are showing the usual seasonal movement toward a lesser volume, although there are individual instances where they have turned upward after a several weeks' decline. The Eastern part of the country, especially New England, continues to provide the greatest selling impetus, but this cannot offset the abnormally poor condition which confronts the industry in the South and the Middle West. Motor car sales executives privately express the opinion that this condition cannot be materially improved until crops are harvested and people in the agricultural districts have some money to spend.

Meanwhile the industry has no intention of manufacturing more cars than the retail market can absorb. It is likely that production during June will total 270,000 to 280,000 cars, although it might go nearer the 300,000 mark. Ford and Chevrolet hold the key to the situation. Chevrolet's original program called for about 84,000 cars this month, but the sensitivity of production to sales is said to have boosted assemblies to 90,000 cars, as retail orders have been somewhat better than anticipated.

June automobile output expected to be 270,000 to 280,000 cars, with possibility of a slightly higher total.

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Chevrolet's schedules this month have been increased twice to keep production on a par with sales; June assemblies are now put at 85,000 to 90,000 units.

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General Motors' sales to dealers in May, at 136,778 cars, were ahead of the same month of 1930. Dealers' sales to consumers—122,717 cars—were closely in line with production.

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Kettering of General Motors and Macauley of Packard emphasize need for automobile industry breaking away from standardization in design if further progress in widening markets is to be made.

Ford output is highly problematical and cannot be forecast by operations at the Rouge plant. It is well known that a large bank of motors and other parts has been built up during the spring months, so that curtailment of activities at Dearborn will not affect branch assembly plants. Incidentally, the Ford company counts its monthly production on the basis of the number of cars assembled, not on the number of motors produced. Under the circumstances, it obviously is difficult to forecast what its output will be during any given period. It is understood that Ford employed during the winter and early spring months more men at Rouge than were needed, as judged by retail sales. This was in an effort to alleviate so far as possible unemployment in the Detroit district during the time when it was most acute. It is not strange, therefore, that the company should find it necessary at this time to release temporarily several thousand men from their jobs.

Ford Eight-Cylinder Car Not Expected This Summer

IN recent months there have been numerous stories published about an eight-cylinder Ford car, some of which have declared positively that it would appear this summer or in the early fall. The latest evidence points to the inaccuracy of these predictions, as those close to the industry have virtually dismissed the idea that a Ford product other than model A is in the offing. There will be changes in model A which will make it more attractive and put it in a better competitive position. Few people realize that there are changes constantly being made in model A, some quite important, which are not specially heralded to the public.

Chrysler activities have fallen off, although acceleration of output by the Plymouth division has made up to some extent for a drop in Dodge operations. Buick's June record will be below May's, probably around 8000 cars. Oakland-Pontiac has been holding up above the average and may finish the month with more than 12,000 cars assembled. Willys-Overland will turn out over 10,000 cars at its present rate, Nash about 4500.

Nash shortly will announce four new models, although its traditional competitors, Buick and Studebaker, will not present new lines until the end of the year, in accordance with the wishes of the National Automobile Chamber of Commerce. Heretofore the latter two as well as Nash have made midsummer model changes.

Studebaker should finish the month with 6000 cars manufactured, Oldsmobile with slightly under that figure. Reo should attain a goal of more than 2000 cars in June. Cadillac and Packard are off from last month's rate, while Graham-Paige, despite the introduction of the Prosperity Six, has decreased operations. Hudson's sales have been stimulated by free wheeling as optional equipment, but its production this month will not exceed 8000 cars. The new DeVaux six is being well received, but the company is going ahead conservatively in establishing new retail outlets. Output in June should be about 4000 cars. Hupmobile will make over 2000 cars this month.

Production Closely Governed by Volume of Retail Sales

THE close watch which manufacturers are maintaining over production to keep it in line with retail demand is again indicated by sales of General Motors Corpn. in May. Sales by factories to dealers were 136,778 cars, slightly ahead of those of the same month in 1930, while sales by dealers to consumers were 122,717 cars, against 131,817 a year ago. That the automobile industry is not sitting back complacently waiting for the halcyon days of 1928 and 1929 to come back is indicated by the action of a prominent manufacturer. It is holding a series of regional meetings of dealers throughout the country at which it is emphasizing the fact that dealers should make up their minds that the present volume of business they are doing is a normal volume and, therefore, they should adjust their administrative and selling expenses so as to make a profit on it. In other words, the industry should not expect a quick return to high levels and must attempt to put itself on a money-making basis under present conditions, which are assumed to be normal.

Before the end of June Dodge will announce free wheeling as optional equipment. A low-priced car, competitive with Ford and Chevrolet, will have free wheeling as standard equipment when its new models are put on the market the first week in July. A still larger manufacturer of low-priced cars is said to be considering free wheeling as standard equipment. If its decision is favorable, the change will be made in the early fall.

The Diesel engine proved its worth in the Indianapolis speed race Memorial Day. The Cummins oil-burning car finished in thirteenth position and had the distinction of being the first car to go through the annual classic without a stop. Averaging 86 miles an hour for the entire route of 500 miles, the car used only $1.75 worth of fuel during the race.

Standardization of Motor Car Design Inimical to Progress

THE necessity of the automobile industry offering the public something new and out of the ordinary, if it hopes to continue to make progress, has been stressed recently by two outstanding executives. Charles F. Kettering, president, General Motors Research Corpn., who says that it is his job "to keep every owner reasonably dissatisfied with his car," states that standardization of ideas is the industry's curse. He declares that the trouble is that all cars today look alike, and there is little to whet one's desire to buy a new car. Standardization of parts and operations has been carried over into standardization of design. Production men have done as much as any other division to thwart progress by seeking to maintain production of a good-selling car at high levels beyond the time when changes should be made. The result is overproduction.

Mr. Kettering emphasizes that if changes in design were made every year, as they should be made, without forcing production of popular models to unreasonably high levels, there would never be overproduction in the industry. Now Alvan Macauley, president of the Packard Motor Car Co., voices his opinion along much the same lines. He states that "it is my belief that when we come out of this depression the demand will be more than ever for products which show a marked departure from the conventionalities of the past. I point to the dangerous tendency that we have been facing of having the automobile lapse into the class of general utilities, like typewriters, adding machines, lawn mowers or what not." Here again is the emphasis on new designs and a departure from the standardization which today makes it difficult for the average person to distinguish one make of car from another.

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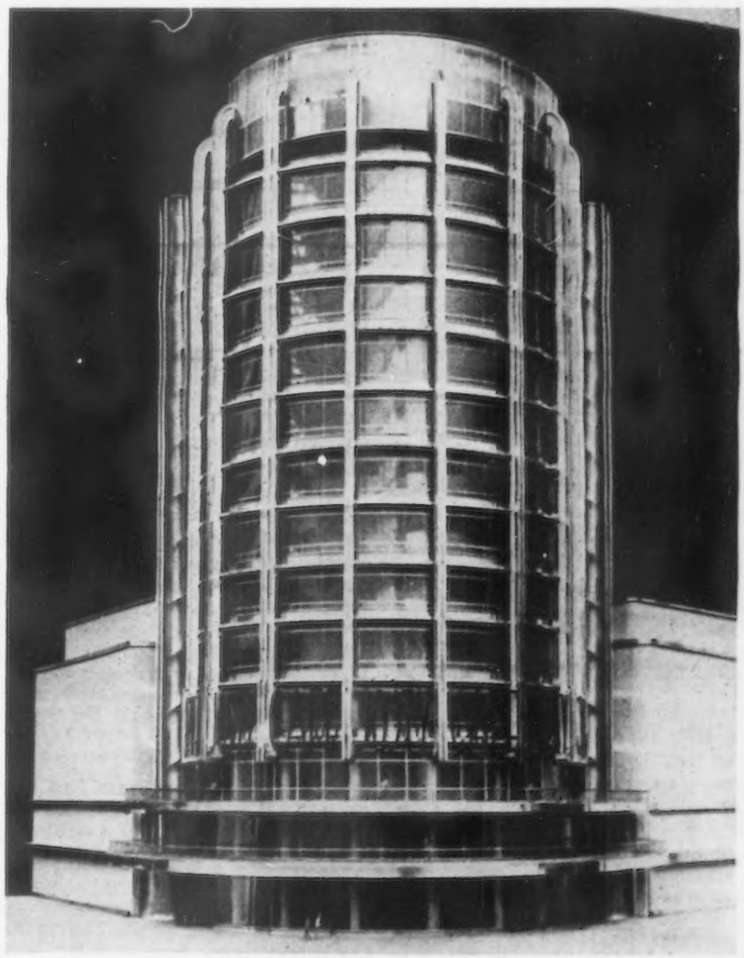

This thoroughly modern steel and glass structure to be known as "House Berlin" is planned for erection on the Potsdamer Platz in Berlin. The steel and glass tubes on each side of the "cylinder" are coverings for the fire escapes.

▲▲▲ PERSONALS ▲▲▲

HARRY T. GILBERT, special assistant to the president of Republic Steel Corpn., with offices in the Union Trust Building, Cleveland, has tendered his resignation, effective immediately. For the time being, Mr. Gilbert is not considering another connection, but will take a long rest. His connection with Republic dates from the Trumbull-Republic merger in the spring of 1928, when he was appointed vice-president in charge of sales. Prior to that time he had been with Sharon Steel Hoop Co., Sharon, Pa., for more than 20 years, leaving the vice-presidency of that company to become associated with Republic.

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JOHN MCGEORGE, veteran Cleveland engineer, has been elected to honorary membership in the Cleveland Engineering Society. Mr. McGeorge was born in Manchester, England, in 1852, and, after receiving a practical training in engineering apprenticeship and engaging for several years in engineering in England, he came to this country in 1884. For several years afterward he was engaged in the design and construction of special machinery. In 1892 he became associated with the late Samuel T. Wellman, and served as chief engineer of the Wellman-Seaver Engineering Co., now the Wellman Engineering Co., from 1896 to 1903. With Mr. Wellman he developed a tilting type open-hearth furnace, an open-hearth charging machine and other steel plant equipment. Since 1903 his work has been mainly of a consulting nature. One of his accomplishments in this period has been the development of an electric factory truck.

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ORRIN C. SABIN, secretary-treasurer, Sabin Machine Co., Cleveland, has been elected president of the Cleveland Engineering Society. MCREA PARKER, chief engineer, Macoustic Engineering Co., has succeeded Mr. Sabin as vice-president. G. OTIS WRIGHT, Roberts-Wright Co., is the new treasurer. ARTHUR G. MCKEE, president, Arthur G. McKee & Co., and W. E. WICKENDEN, president, Case School of Applied Science, were elected as new members of the board of directors.

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J. C. WILLIAMS, president, Weirton Steel Co., Weirton, W. Va., has been elected president of the Peoples Bank of Holliday's Cove, W. Va.

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W. C. MANDER, widely known flour-mill machinery engineer, has been promoted to sales and milling engineer, flour-mill division, Allis-Chalmers Mfg. Co. He succeeds the late James Forrest, with whom he was

HARRY T. GILBERT

associated during the past five years. Previously he was for many years chief engineer, Nordyke & Marmon Co., Indianapolis, becoming associated with the Allis-Chalmers Mfg. Co. when it acquired the flour-mill business of Nordyke & Marmon.

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DR. C. E. SKINNER, assistant director of engineering for the Westinghouse Electric & Mfg. Co., East Pittsburgh, and president of the American Institute of Electrical Engineers, was awarded the Benjamin Garver Lamme medal for meritorious achievement in engineering at the annual commencement exercises of Ohio State University, Columbus, last week.

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W. S. GUY, traffic manager of the Carnegie Steel Co., Pittsburgh, was elected president of the Pittsburgh Traffic Club at its annual meeting held recently. Among the other officers elected were E. M. GARLAND, general traffic manager for the Pressed Steel Car Co., first vice-president, and S. B. DUFF, assistant traffic manager of the National Tube Co., treasurer.

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I. LAMONT HUGHES, president Carnegie Steel Co., Pittsburgh, has been elected to the board of trustees of Grove City College, Grove City, Pa.

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F. F. ELLIOTT has been appointed mill and foundry superintendent for the Westinghouse Electric & Mfg. Co., East Pittsburgh. In his new capacity Mr. Elliott will have general charge of the brass foundry, copper mill and Trafford, Pa., iron foundry operations. H. F. SEIFERT has been named superintendent of the brass foundry and copper mill, and J. R. THOMPSON will continue as superintendent of the Trafford foundry and pattern shop. C. R. STEVENS has been appointed purchasing engineer in the company's purchasing department.

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J. CLARK COIT, president, United States Radio & Television Corpn., Chicago, has been elected president of the Radio Manufacturers' Association.

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LYMAN D. ADAMS, president and general manager, Barnes-Gibson-Raymond, Inc., has been elected president of the Employers' Association of Detroit.

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JOHN R. REPLOGLE has been appointed vice-president in charge of engineering of Copeland Products, Inc., manufacturer of electric refrigeration equipment.

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ARNOLD LENZ, general manager of the gray iron foundry of the Chevrolet Motor Co., Saginaw, Mich., has been appointed a member of the citizen's advisory committee on unemployment stabilization by Governor Brucker.

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R. E. W. HARRISON, chief engineer, Cincinnati Grinders, Inc., has been reelected chairman of the Cincinnati section, American Society of Mechanical Engineers. H. C. UIHLEIN and W. H. VOCKELL, Cincinnati Engineering Tool Co.; WILLIAM F. GROENE, R. K. LeBlond Machine Tool Co.; GEORGE SEYLER, Lunkenheimer Co.; GEORGE LANGAN, Cincinnati Planer Co.; C. L. KOEHLER, Alvey-Ferguson Co., and HARRY FELDBUSH, Worthington Pump & Machinery Corpn., have been named members of the executive committee.

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JAMES A. IRELAND has been appointed sales manager for the central district of Steel & Tubes, Inc., with offices in Cleveland. He has been connected with the company's sales organization in the Ohio territory.

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ALVIN M. KARSTENSEN, formerly Pacific Coast representative of the Truscon Steel Co., Youngstown, has become district manager for the Pacific Coast for the Campbell Industrial Window Co., New York.

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L. C. MCCASKILL, who has been identified with the automotive industry for over nine years, has become

special representative in the Southwestern territory, with headquarters at Kansas City, Mo., for Aluminum Industries, Inc., Cincinnati.

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FRED GROTTS became affiliated with the Continental Roll & Steel Foundry Co., East Chicago, Ind., as metallurgical engineer, with headquarters at East Chicago, on June 1 and will direct the metallurgical activities of the Hubbard Steel Foundry Division, East Chicago, Ind.; the Wheeling Mold & Foundry Division, Wheeling, W. Va., and the Duquesne Steel Foundry Division, Coraopolis, Pa. Attending the University of Illinois and the University of Missouri, Mr. Grotts was graduated from the latter with the degree of Bachelor of Science in Metallurgical Engineering. For a time he was industrial metallurgical engineer with the Public Service Co. of Northern Illinois, and in 1916 went with the Curtiss Aeroplane & Motor Corpn., Buffalo, as metallurgical and chemical engineer, having technical control over all processes. For his service there he was cited by the governments of the United States, Great Britain and France. After the war he joined the Caterpillar Tractor Co., Peoria, Ill., as foundry manager and technical supervisor of the plant, leaving after seven years' service to go with the American Steel Foundries, Granite City, Ill., as superintendent of wheels, the position he relinquished to make his present connection. Mr. Grotts is recognized as an authority on the heat treatment of cast steel and cast iron, and has written and presented many papers on these and kindred subjects.

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F. E. ROSS has been named president and general manager of the American Furnace & Foundry Co., Milan, Mich., succeeding E. L. Watson, who resigned several weeks ago. C. W. STEIDLE has been named secretary and treasurer of the company, taking the position left vacant by Mr. Ross.

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E. O. SESSIONS, head of the Sessions Engineering Co., Chicago, has accepted the invitation of the Soviet Government to visit Russia for the purpose of making a survey of the industrial situation in that country and a general study of the five-year plan. He is now en route to Moscow.

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BEN SLOAN, who represents the Pratt & Whitney Co. in New Jersey, sailed on June 13 with the American Society of Mechanical Engineers' party for a joint meeting with the Verein Deutsche Ingenieure at Cologne, Germany. While in Europe Mr. Sloan will visit England, France, Italy and Switzerland.

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JOSEPH ESHELMAN has been appointed representative by the Northern Equipment Co., Erie, Pa., to handle its line of boiler plant equipment in eastern Tennessee. This is an extension of the territory formerly served by Mr. Eshelman from offices in the Webb-Crawford Building, Birmingham.

FRED GROTTS

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C. L. SAUNDERS, general advertising manager and purchasing agent of the Morse Chain Co., Ithaca, N. Y. (now merged with the Borg-Warner Corpn., Chicago), has retired. After an extended vacation, he plans to resume work as a consulting engineer, specializing in reports on mechanization. Mr. Saunders is a graduate of the Case School of Applied Science, Cleveland, and, before his association with the Morse company, was for 10 years consulting engineer and general contractor.

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CHARLES GROSS, who has been superintendent of the South Side, Pittsburgh, works of the A. M. Byers Co., has been appointed general superintendent of the company's Economy, Pa., plant, succeeding C. W. EDWARDS, who has resigned. Mr. Gross has been identified with the Byers company during his entire business career, having succeeded his father in the position he has held recently. AMOS KAMERER, who has been pipe mill superintendent at the South Side plant, succeeds Mr. Gross as general superintendent at the same works.

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GILBERT L. HARTMAN, purchasing agent, Oilgear Co., Milwaukee, has been elected president of the Milwaukee chapter, National Association of Purchasing Agents; SAMUEL WILSON, of Kearney & Trecker Corpn., vice-president; HERBERT A. FRANK, Sterling Wheelbarrow Co., secretary, and WALTER RUST, treasurer. FRED R. GOERKE, of Gilson-Bolens Foundry & Machine Works, Port Washington, Wis., was added to the board of directors.

Amtorg Head Describes Soviet Engineer's Life

The Soviet Government endeavors to provide the best available living conditions for foreign technical advisors, according to Dr. I. G. Ohsol, vice-president, Amtorg Trading Corpn., who spoke at a meeting of the Tropical Engineers Club at the Building Trades Employers' Association, 2 Park Avenue, New York, on June 5. While satisfactory conditions are provided in the cities, he said, conditions in the new industrial districts are often those of the frontier. As an example of living conditions for a foreign engineer, he described in detail the Freyn Club, which now includes about 50 engineers, who have two and three room apartments in a community of their own. He said that a number of American skilled workmen had gone to the Soviet Union in recent months, and others to be engaged in the steel and other industries were going in the coming few months.

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Bondholders Committee for Empire Steel

A bondholders' committee for the Empire Steel Corpn., Mansfield, Ohio, has been appointed to protect the interests of holders of 8 per cent bonds of the Mansfield Sheet & Tin Plate Co., which was absorbed by the Empire Steel Corpn. in 1928 and to assist the receiver of the Empire Steel Corpn., now in receivership, in working out its affairs. There are outstanding $2,300,000 in bonds, which mature serially. These bonds were in default June 1 for $150,000 principal and interest.

Frank A. Scott, former chairman of the board of Warner & Swasey Co., Cleveland, is chairman of the bondholders' committee. Other members are Otto Miller of Hayden-Miller Co., Cleveland; Elton Hoyt II, partner of Pickands, Mather & Co., and H. H. McClintic, Pittsburgh, formerly of McClintic-Marshall Corpn. A fifth member to be selected from Mansfield will be added to the committee.

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Company 100 Years Old

Philadelphia Quartz Co., Philadelphia, on July 21 will have completed a century in business. The enterprise was founded in 1831 by Joseph Elkinton for the manufacture of soap and candles. In 1861 the company started manufacturing silicate of soda, in addition to its other products, and in 1904 soluble silicates became its exclusive products. In a booklet commemorating this concern's centennial, the growth from a small store in Philadelphia to the present organization involving nine plants throughout the country is cited. William T. Elkinton, who joined the company in 1879, is chairman.

Destroying a Sphere to Learn Its Qualities

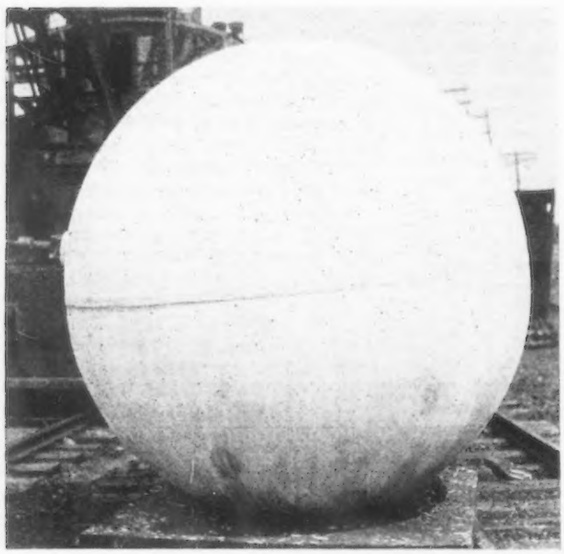
A LARGE steel ball was blown to pieces in a spectacular test conducted at the A. O. Smith Corpn. plant, Milwaukee, on May 15, before a gathering of Government officials, representatives of regulatory bodies and Navy officers. It was the culmination of a lengthy test program, designed to demonstrate the quality and to furnish data on this new type of high-pressure container for transporting and storing helium gas used by the United States Navy.

The vessel was one of a group now under construction for the Navy. It was spherical, 7 ft. 10 in. in diameter, made of heavy alloy steel plates and welded around the "equator" with the Smith patented process. After passing the regular acceptance test, it was mounted on a turntable and, while under an internal pressure of 2360 lb. per sq. in., it was hammered with powerful air-hammers for 72 consecutive hours. Over 30,000,000 blows were struck during that time.

Following this punishment the sphere was placed on a steel foundation and, while under 2620 lb. pressure (producing 64 per cent of a yield point), a heavy weight was dropped on it from a height of 23½ ft. The "skull cracker" weighed close to one ton, thus delivering a blow of 47,000 ft.-lb.

This might be compared to a 10-ton weight being stopped within 4 ft. distance, while moving at 30 miles an hour. This test was first made on the pole and then repeated on the weld, in each case making a dent about 13 in. in diameter and 3/16 in. deep.

As a concluding and final test, the pressure was raised until failure occurred. Heavy steel guards were placed around the ball and instruments connected to record the behavior of the vessel as it approached destruction. The vessel finally failed on an internal pressure of 5700 lb. to the sq. in.



WELDED sphere for carrying helium, with its filling pipe at left. This sphere was tested to destruction, with results as shown in second illustration, which shows the precautions with which the final test was surrounded.

Automotive Engineers Hold Summer Meeting

WHITE SULPHUR SPRINGS, W. VA., June 14.—With a session on motor trucks and motor coaches, the summer meeting of the Society of Automotive Engineers opened at the Greenbrier Hotel here today. The meeting comprises 13 technical sessions, a business meeting, aviation demonstrations and many entertainment features. The technical program, which ends Friday morning, June 19, includes papers on Diesel engines and fuels, transportation, passenger cars and bodies, fuels, technical standards, aircraft, aircraft engines, and automobile engines and chassis.

Progress in S. A. E. standardization work will be reported on and a general session will be devoted to the cost of labor turnover to industry. A session on future developments will feature a paper on the possibility of mounting the engines in the rear instead of leaving at the front under the hood. The passenger car session includes a paper on the "tear drop" body, which is a development of airplane design intended to give greatly increased speed for the same horsepower, as well as more space inside, better disposition of seats and a clearer view of the road ahead.

Trackwork Production Declines Further

Shipments of trackwork for T-rail track of 60 lb. and heavier are reported by the American Iron and Steel Institute at 7453 net tons in May. This represents a decline of 13 per cent from the April shipments of 8564 tons, and is the lowest monthly total since that of February. In May of last year shipments were 12,799 tons.

In the first five months of the year total shipments have been 36,908 tons. This compares with 63,757 tons in the first five months of 1930, a drop of 42 per cent.

OBITUARY

THOMAS L. CANNON, Pittsburgh manager for the McClintic-Marshall Corpn., a subsidiary of the Bethlehem Steel Corpn., died at his home in that city on June 11, aged 47 years. He had spent his entire business life in the steel fabricating business, having entered the employ of the Gerber Engineering Co., Bethlehem, Pa., immediately after his graduation from Lehigh University. The following year he went with the McClintic-Marshall organization, and had served as manager of its Carnegie, Rankin and Leetsdale, Pa., works before promotion to the position he held at the time of his death.

Production May Reach New Low This Summer

BY DR. LEWIS H. HANEY

DIRECTOR, NEW YORK UNIVERSITY BUREAU OF BUSINESS RESEARCH

ACCORDING to our estimates, the average daily steel ingot output in May declined more than seasonally and was only 57.7 per cent of a computed trend based on the past 10 or 15 years. This compares with 57.1 per cent in January, and 52.1 per cent in December. It seems probable that June production will approximate the December level in percentage of "normal." A new low level may be reached in either June or July.

We note that the recession since March has been more moderate than in either 1924 or 1921. Steel production in May averaged 42 per cent below the level at which it would have been if it had followed the long-time upward trend. Even if we imagine that a downward trend has set in, it was 25 per cent below any conceivable normal level. It has been for 15 months below any conceivable normal. It is not nearly so low as in 1921, but probably there has not been such an accumulation of stocks as then.

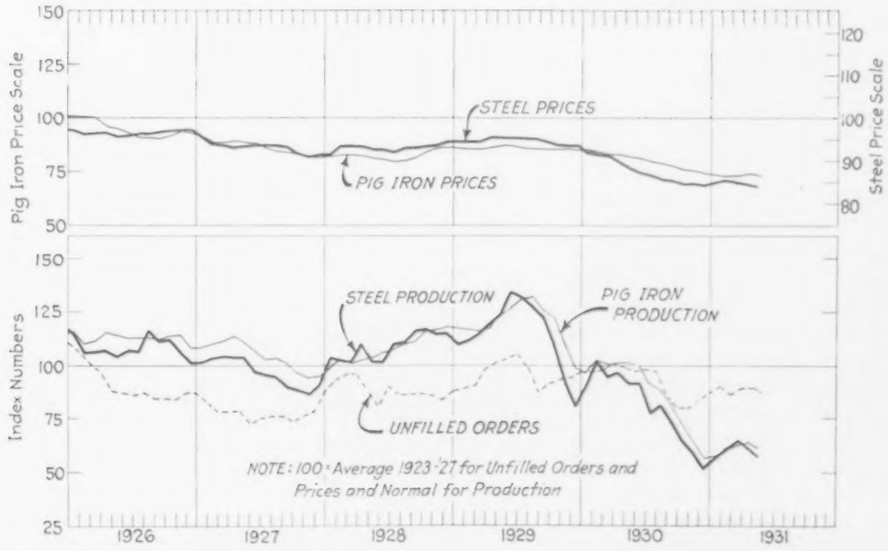
Pig iron production, also, declined more than seasonally in May, falling to 62.2 per cent of the estimated "normal" (based on the trend of past years). This compares with 57.3 per cent last December. Blast furnace activity declined in May much as it did in the same month of 1927 and of 1930. Often such a reversal in the relatively smooth curve of blast furnace activity is followed by a fairly prolonged, though not necessarily sharp, decline.

The relative position of pig iron production and steel production is frequently significant. We find the former appreciably above its average relation to the latter, a condition that has obtained for two months. Usually this condition indicates a maladjustment and weakness in pig iron prices. In view of the low levels of production, however, and the indications of a curtailment in pig iron output, another 60 days may bring it in line with steel production and mark the final stage of the recession.

Unfilled orders of the Steel Corporation, also, declined more than usual for May. True, the decline, measured in tons, has often been exceeded; but in judging the trend one should allow for the current level of unfilled orders—in other words, deal with percentages. The normal percentage of decline in unfilled orders in May (allowing for the long-time declining trend of the total) is about 5 per cent. Actually the decline was a little over 7 per cent.

It is difficult to escape the conclusion that a decline in unfilled orders is to be regarded as an unfavorable development. While a letdown in orders by automobile manufacturers was doubtless a factor, we are inclined to emphasize the structural steel demand. There was a sharp increase in the bookings of structural steel in April, which more than offset declines in orders for sheets, plates and castings. Preliminary weekly data for May, however, indicate a large decline in fabricated structural steel bookings, without which the continued low level of sheet buying could hardly have brought such a decline in unfilled orders.

Working against steel prices are the following: (1) a large decline in unfilled orders, (2) further declines in steel scrap, and (3) a continued recession in the general level of commodity prices. Tending to support steel prices are the curtailment in production and the realization of the manufacturers that some items of finished steel are selling below cost. The monthly average price of finished steel is the lowest since April, 1922, while pig iron, steel scrap and most basic commodities are at "pre-war levels." Steel scrap is the lowest since 1914 and, while further weakness is to be expected, seasonal factors will be working in favor of this extremely depressed market within another month or two.



Pig iron production remains too high in comparison with steel. Both were off more than seasonally in May. Prices may be weaker for pig iron, for a month or more. And the unfilled order curve shows a disturbing decline.

W. W. MACON
Editor

THE IRON AGE

A. I. FINDLEY
Editor Emeritus

(ESTABLISHED 1855)

Feeding the Flames of Deflation

THE deflationist school of economists is becoming more vocal as the depression continues. According to the view of this group, prices of all goods and services must be brought down to the level of those which have suffered the sharpest decline. This, it is contended, will restore economic balance, the *sine qua non* of recovery.

Theoretically, the platform of the equilibrists carries a strong appeal, but it is interesting to observe that it has relatively few adherents among manufacturers. For one thing, industrialists are well aware that economic forces are conditioned by the actions of men; that "supply and demand" is a loose formula producing varied answers and that prices of services per man have no fixed relationship to unit costs. As practical men they are well aware, even if many economists have not yet discovered it, that this depression is unique because of the emphasis it has placed on preserving the buying power of labor. They know that our greatest advances in industrial development in the past decade have been in the production of mass consumption goods, the largest market for which is among our industrial workers. If volume of output is not possible now, it nevertheless, in their view, holds the key to the future.

Manufacture in volume broke down because it was abused, not because it had intrinsic defects. A self-perpetuating mass production era will avoid the errors of taking excessive profits or of putting too large a part of earnings into plant expansion; it will adhere closely to the policy of returning the major share of production economies to the public in the form of lower prices and higher wages, to the end that consumption may be further increased. Low unit costs, low unit profits, lower prices as conditions permit and higher wages per man (but not for production per man-hour) will be the order of the day.

It is possible, of course, that we are economically sliding down to an entirely new level of values. If this really be the case a readjustment of all prices, whether for goods or services, is inevitable. But many manufacturers are not convinced that the low prices to which farm products and other raw materials have sunk are necessarily permanent or indicative of what must happen to other commodities. They believe that restoration of balance will see the recovery of overdeflated commodities as well as the further decline of lines that still may be overpriced. Moreover, a drastic deflation of all products to raw material levels would subject our economic structure to a shock that would imperil its very integrity. A further, sudden downsweep in building values, for example, would threaten insurance companies, banks and all other institutions holding mortgage paper.

And after such deflation had been accomplished, what would follow, assuming that business recovery should actually set in? Surpluses of products, which in large part are due to the reduced consumption of the depression period, would melt away and prices would tend to advance. Our vast reservoir of credit, now stagnant, would become active again, also supporting prices and stimulating trade. Deflation would be followed by inflation, and it would be rightly contended that the huge losses suffered to bring about a temporary condition were needless and unjustified.

More Foresight, Less Hindsight

LAST August this department of THE IRON AGE called for "a moratorium on predictions." It was the well remembered period of "improvement just around the corner" and the predictions died a natural death, as the continuance of depression gave them ample time to do so. Now the suggestion is made that we have more foresight and less hindsight.

It was quite a while before much was said about what "caused" the depression. For one thing, men were bewildered, and for another thing they did not know just what it was that needed to be explained. The depth, duration and circumstances of the depression were not realized. Of late some men have thought they understood what has occurred and have proceeded to explain why, thereupon suggesting preventive measures for the future.

Such dissertations are interesting in a way, but they confuse men's minds by taking things out of their proper proportions. Some of the talk reminds one of the old saying about locking the stable after the horse is stolen. Let us get prosperity first and then it will be time enough to study the past and provide measures to prevent its loss. Again, some of these reviews, going into the dim and distant past, tend greatly to foster the erroneous notion that depressions are much alike, that they have been simply a recurrent malady, like hay fever for instance. That impression is very harmful to right thinking.

The statisticians have dug up records of the pulse, temperature and respiration of various patients in the past, and encourage us to think that each patient had the same malady, and that is harmful. The human mind can go wrong in various ways just as the human body can, and the statisticians are unable to dig up adequate records of what was in men's minds prior to and during those depressions of the past. There is reason to favor the view that depressions are made by

men, not by materials. It is men who produce and consume materials.

The longer a depression lasts the more different things are going to be when it is over. Fundamental conditions are always changing, and in bad times as well as in good times. The longer the period, the greater the sum total of change. With a short depression like that of 1907-1908 we got back in a measure to the old circumstances, but even then not fully. A few men have now lately appeared to assert that when we do get out of the present situation it will be as a result of far-reaching changes. That is foresight along right lines and such foresight is discouraged by the hindsight that digs up some facts as to past depressions, taking them out of their whole setting, a much bigger thing than can be surveyed at this late date.

As a matter of fact no one can really imagine our getting back to the times of two years ago, when the extra bulge in our long period of activity just reached its crest, or three years ago, when there was merely continuance of the activity that had prevailed for between five and six years. Those activities, and conditions as they have been fundamentally changing, simply will not fit. Our next prosperity will be in different circumstances, and new circumstances. It is not a good way to conceive new things by dwelling upon old things. Real inventors do not do that. Many great inventions have come by men shunning the past. Let us have more foresight and less hindsight in our thinking and talking.

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Excess Capacity of the Individual

MORE emphasis could well be laid in these times on what we may call the excess capacity of the individual. Consumption today is greater than one would expect in view of the depth of the depression as commonly gaged, and the number of people out of employment or on part time. There is much less hardship, as to insufficiency of food, clothing and shelter, than one would expect. The explanation is that the capacity of the individual has grown more than his needs.

After every depression there has been eventually a higher plane of living than ever before, but it takes time for things to work out. Men who predict "better times than ever" are commended by some and ridiculed by others, but as a matter of fact they are merely stating a self evident truth. They omit only the details as to time and manner, for the sufficient reason that they have no precise ideas on the subject. Only in years to come, after we have risen entirely out of the present depression, will there be a higher level of living.

As things stand today the individual has more capacity to produce than to consume. If by some freak of fortune, "business" should suddenly become as good as anyone can reasonably imagine, there would not be forthwith full-time jobs for everybody. There would not be enough attractive luxuries for people to buy promptly to take up all the slack. Quite possibly important new things will be devised even in the near future but they are not yet and it takes time to introduce them. The known luxuries of today are not sufficient.

It is rather a curious thing that several years ago, when people were relatively well occupied, there was no little talk about shortening the hours of labor so that men would have more time to spend on diversions and luxuries. Now there is little such talk and the attitude has apparently changed. The situation now being faced is one of curtailed and uncertain demand for employment as against full working opportunities that then seemed of long duration. There is now too much fear of the "living standard" being reduced, whereas the sum total or average living standard of the entire people is a practically fixed thing at a given time.

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On Income Taxation

PERSONAL income taxes are not popular, remarked Mr. Mark Graves, New York State Tax Commissioner, recently, but nevertheless he could think of no tax that is fairer. "If one has no income he pays no tax. If he has income he pays in proportion to the amount he receives." This is, perhaps, a sound theoretical principle that is never applied.

Secretary Mellon finds fault with the application that causes the Federal Government to rely mainly upon income taxes paid by only 2,500,000 persons, whereof about 97 per cent is collected from 350,000 persons and 250,000 corporations. Secretary Mellon is loose in comparing 2,500,000 taxpayers with the total population of 120,000,000. A correlation with the number of families or of workers would be sounder.

Senator Couzens does not offer the latter criticism but he points out that the taxes that are collected from corporations really come out of their stockholders, whom he estimates at about four million. Even so, the concentration of this kind of taxation is evil.

Secretary Mellon would broaden the base, i.e., cause more persons to pay direct taxes. The radical Senators would do more cultivating in the top, i.e., increase surtaxes still further. This brings out sharply the difference between a scientific theory of taxation and a punitive one. The latter aims to prevent the enjoyment of large incomes by anybody.

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Professional Economists Passing Out

THE world is getting tired of the dogma of Prof. Gustav Cassel of Sweden, that gold is responsible for existing economic evils. Likewise is it being wearied by the dicta of other economists that the capitalistic system is worn out, that business is adrift, that the Russians have invented something better, etc.

It is absurd on the face of things to reason that a great depression in 1920-22 was a normal aftermath of war, but that the depression of 1929-31 is a tottering of the capitalistic system. It is absurd to view the misery of Russia as a paragon for economic emulation. The Russians know no such thing

as over-production, and if the rest of the world is really suffering from that the economists will have to eat their past words.

The dangerous aspect of the association of economic crisis with monetary policy is that labor is only too anxious to adopt that attitude. In low-brow analysis, we lack the courage to face the facts of certain labor union tyranny, pernicious dole systems, and political extravagance.

Instead of illuminating such obvious evils the academic economists see ghosts and specters. As a by-product of the present depression we foresee a disrepute for professional economists and a thinning of their ranks.

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Seamless Tube Mills at McKeesport

(*Concluded from Page* 1966)

whether the work has resulted in a pipe which is within the specifications, or is too light or too heavy. Comparison of the length and weight, by the aid of a prepared table, covers this point. As soon as a car has been loaded with pipe, it is again checked on both the length and weight basis, as a final determination.

Capacities of the two mills are rated at 100,000 tons annually for No. 1 and 150,000 tons for No. 2. The short period in which they have been in operation, however, has convinced the company that these tonnages can be considerably exceeded, particularly on No. 1 mill.

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Golden Gate Bridge to Be Longer Than Hudson River Bridge

(*Concluded from Page* 1979)

lb. basis. This includes the towers, which utilize silicon steel in the top 200 ft. and for the cross strut beneath the roadway. Silicon steel chords of the stiffening trusses are designed for a unit tensile stress of 32,000 lb. and the same stress is used for the silicon steel lateral bracing. Carbon steel webs in the stiffening trusses have been given a unit stress of 21,000 lb. The floor beam webs and the stringers are of carbon steel of 16,000 lb. designed tensile stress.

Specifications for the cable wire require it to be cold-drawn, with a minimum ultimate strength of 220,000 lb. to the square inch. The yield point must reach 160,000 lb. and a cable stress of 82,000 lb. was used in the design. Ductility is represented by 4 per cent elongation in 10 in.

Comparison with Existing and Projected Bridges

IN the diagram are shown outlines of a number of large existing bridges in various parts of the world, together with this new Golden Gate bridge, and projected bridges across the Hudson River at Fifty-seventh Street, New York, across the Narrows between Brooklyn and Staten Island, and across the Mississippi River at New Orleans. These show visually the relation of all these bridges to each other in their principal dimensions, and illustrate the tremendous advance which has been made since the time of the famous Brooklyn Bridge.

It is noteworthy that, of the 19 bridges shown, not less than 10 are in the port of New York, six of these 10 being already in use, and two others almost completed. Only three of the bridges shown are outside the United States, one being in Canada, one in Scotland and one in Australia. With two exceptions, every one of the 19 bridges has a main span exceeding a quarter mile in length. So far as records are available, there is no bridge anywhere in the world, with a main span of more than a quarter mile, which is not included in this group.

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Lubricating Systems for Roll Necks

UNTIL comparatively recent times the progress made in the art and science of steel mill lubrication was confined largely to the utilization of straight mineral oil of light and medium viscosity as the lubricating medium, according to an article by Maurice Reswick, mechanical engineer, Pennsylvania Lubricating Co., Pittsburgh, published in *Blast Furnace and Steel Plant*. An extract from that article, showing some of the changes which are taking place, follows.

It is an established fact that the available range of high-quality lubricating oils developed for every application where oil may be used to advantage, together with the elaborate and thoroughly efficient circulating oiling systems, represent a remarkable accomplishment. However, the lubrication requirements on heavy steel mill machinery, and particularly on roll and pinion necks, are admittedly met best when grease is used as the lubricating medium.

The next logical step, therefore, was the development of lubricating systems designed to handle grease and feed it under pressure to the bearings. The principle of pressure grease lubrication, as applied to roll necks, has already been amply demonstrated, and its advantages are fully recognized by all who have investigated this subject.

Many Systems Already in Use

Mechanical pressure systems are in everyday successful operation on blooming mills, plate mills, rail, structural, continuous strip and other mills. The pioneer plants which were the first to experiment with these systems are enthusiastic advocates of this method of lubrication, and they are gradually extending it to every possible application throughout their plants. And yet the field as a whole is barely touched, and automatically lubricated roll stands are still the exception instead of the rule.

It is safe to predict, from all present indications, that within the next few years mechanical lubrication of roll necks, large and small, will become standard practice.

Gradual Recession of Steel Production Is Unchecked

INGOT Output Now 38 Per Cent of Capacity—Further Retrenchment by Automobile Industry — Hopes Pinned on Early Fall Recovery

THE recession of activity in the iron and steel industry is unchecked, with ingot production down to 38 per cent as compared with 40 per cent a week ago. Among the leading steel centers, Pittsburgh, Chicago, Cleveland and the Wheeling district all report reductions of output. Barring unforeseen developments, further declines in operations now seem unavoidable, with the possibility that the low levels of last December will be reached before the end of July.

The steel trade has become reconciled to the prospect of a very dull summer and is now pinning its hopes on a seasonal recovery in the fall. Some producers continue to carry out the policy of closing their higher cost plants and one fully integrated steel company is reported to be planning to suspend operations entirely during July. While this program of drastic retrenchment is dictated by costs, it is counted on to cause further liquidation of already low stocks and thereby add momentum to demand when business revives.

OTHER factors that may contribute to an autumn rebound are the harvesting of crops, which will give the agricultural population cash for purchases, however subnormal they may be, and the plea of the railroads for an advance in rates. Assurance of relief to the carriers is believed to be essential to restore them to their position as leading consumers of iron and steel.

Declines in automobile steel specifications continue to have the strongest influence on mill operations. June automobile output is now expected to total about 270,000 cars, and July production will be considerably lower, with the extent of curtailment depending on whether contemplated shutdowns of certain motor car builders occur in that month or in August.

SEASONAL subsidence of iron and steel demand is still noticeable in other lines. Rail output at Chicago has declined to 30 per cent of capacity, but has picked up slightly at Pittsburgh following the release of some of the 152-lb. sections recently ordered by the Pennsylvania. Tin plate output has eased off sl'ght'y to a 65 per cent rate. Wire mill operations now range from 30 to 35 per cent. Production of line pipe, structural steel and reinforcing bars is being fairly well maintained at recent levels. Among individual consuming outlets, the radio industry is conspicuous for increasing its specifications, a few manufacturers of receiving sets having released tonnage prior to swinging into seasonal production.

THE coal strike has thus far failed to materialize as a major market influence. In some cases prices of coal and coke are stronger at old levels, but no advances are reported.

Scrap markets still show weakness, with heavy melting steel off 50c. a ton at Cleveland and 25c. at Detroit. However, prices of the leading grade are unchanged at Pittsburgh, Chicago and St. Louis.

INTEREST in steel prices centers in the efforts of sheet mills to establish the new classification base prices for third quarter business. In the case of black sheets the new base involves an advance of $5 a ton and the increase on galvanized is $3. The third quarter quotation on automobile body sheets is 3.10c. a lb., or $2 a ton over recent levels. While resistance to these changes may be encountered, the attitude of producers is being strengthened by the realization that price concessions are unlikely to bring in any additional tonnage in the next two months. Except for sheets and hot-rolled strip steel, which has been advanced $1 a ton for third quarter, no price changes on finished steel appear to be in prospect.

Fabricated structural steel awards, at 24,000 tons, compare with 48,000 tons a week ago. New business up for bids totals 35,000 tons, as against only 11,000 tons reported last week. Outstanding among prospective structural inquiries is 22,000 tons for the Union Island Freight Terminal, New York.

Railroad equipment buying is featured by the placing of 500 box cars by the Chicago Great Western. Inquiries include one for 400 tunnel cars from the Chicago Tunnel Transport Co. and another for 800 underframes from the Fruit Growers Express.

Zinc has advanced from a recent low of 3.20c., East St. Louis, to 3.40c. Heavy buying of lead is reported for a second week, and a gain in consumption this month is indicated.

THE IRON AGE composite prices are unchanged, with finished steel at 2.102c. a lb., pig iron at $15.63 a gross ton and steel scrap at $9.50 a gross ton.

PITTSBURGH

Further Curtailment of Steel Production Now Seems Unavoidable

PITTSBURGH, June 16.—With no marked change in the character of steel buying in the past week, curtailment of production continues in the Pittsburgh district. The average operating rate in steel-making departments is expected to reach the low levels of last December before the end of July. Two more steel works blast furnaces in the Pittsburgh area have been blown out, and the leading interest is now operating only seven of its 32 available stacks. A merchant furnace in the Valleys has been blown out, but this is the only loss there since the first of the month, pig iron production in the Valleys having been better maintained than in Pittsburgh. Steel ingot production has dropped slightly under 40 per cent of capacity and further curtailment seems unavoidable if raw steel production is to be kept adjusted to the demands of finishing mills. Production in the Wheeling district is also down slightly, while output in the Valleys is unchanged.

Complete suspension of operations in individual plants continues, and it is reported that one fully integrated steel company will suspend operations entirely during July.

Declining releases from the automobile industry are still accounting for most of the curtailment in bars, sheets and strip steel, but these were generally expected, and further retrenchment during July is probable. Tin mill schedules are slightly lower than last week, but production in this department is still much better than in other finished steel lines. Output of line pipe, structural steel and reinforcing bars is fairly well maintained in keeping with seasonal expectations. However, no large pipe line projects have been reported placed, and operations are supported largely by orders for feeder pipe and other small tonnages. Prospects for barge buying are still considered good, and a number of semi-active inquiries are still in the offing. Radio manufacturers have increased their sheet and strip specifications slightly, but no significant tonnage is involved. In other manufacturing lines, consumption of steel is still reacting to seasonal downturn.

The raw materials market continues dull, although a substantial tonnage of basic pig iron is reported to have been placed by a local steel company. The scrap market is very quiet, following purchases last week by a leading consumer.

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Decline in steel production unchecked, and further curtailment seems to be certain.

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Ingot operating for Pittsburgh district has fallen slightly under 40 per cent.

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Smaller releases from automobile industry still accounting for most of the decline.

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At least one fully integrated steel company will suspend operations entirely during July.

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Scrap market dull, but prices have not declined further.

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PIG IRON

A non-integrated steel company in the Pittsburgh district is reported to have closed with a nearby steel company against its recent inquiry for basic iron. The shipment will be made by water, and the price paid was not disclosed. No other transactions of importance are reported, and demand is confined to carload lots for immediate shipment. Prices are unchanged.

Prices per gross ton, f.o.b. Valley furnace:

Basic	$15.50 to $16.00
Bessemer	17.00
Gray forge	16.50
No. 2 foundry	17.00
No. 3 foundry	16.50
Malleable	17.00
Low phos., copper free	26.66 to 27.00

Freight rate to Pittsburgh or Cleveland district, $1.76.

Prices per gross ton f.o.b. Pittsburgh district furnace:

Basic	$16.00 to $16.50
No. 2 foundry	17.50
No. 3 foundry	17.00
Malleable	17.50
Bessemer	17.50

Freight rates to points in Pittsburgh district range from 63c. to $1.13.

SEMI-FINISHED STEEL

No third quarter contracting is reported in this market, and shipments are substantially lower than they were during May. Billets, slabs and sheet bars are quotable nominally at $29 to $30, Pittsburgh or Youngstown, and forging billets at $35, Pittsburgh. Makers of wire rods are willing to accept third quarter contracts at unchanged prices.

RAILS AND TRACK SUPPLIES

Some of the 152-lb. rails ordered recently by the Pennsylvania Railroad were rolled in the local mill last week. Work on this contract has given slight impetus to operations. No new business has developed in track accessories, although a few minor inquiries are before the trade. Releases are lighter than they were last month, but some of the carriers have ordered out practically all of the material they had contracted for. Light rails are very quiet, with occasional sales of new billet stock at $34, Pittsburgh.

BARS, PLATES AND SHAPES

Declining specifications from the automobile industry have made the bar market even more quiet than usual, while demand for plates and shapes is unchanged. Inquiry for fabricated structural steel is still fairly heavy, but awards are slow to be made. The larger fabricators in this district have fair backlogs, but are not yet able to work on some of the orders taken earlier in the year. Small jobs are particularly scarce, with the result that schedules of fabricators are uneven. No action has yet been taken on the South Tenth Street bridge at Pittsburgh, which calls for about 5000 tons of shapes. The barge market looks a little more active, although no new lettings are reported. The Standard Oil Co. of Kentucky has postponed action on its recent barge inquiry for 60 days. Two or three other fair-sized inquiries are in prospect. Tank fabricators have benefited slightly from work in the east Texas oil fields. Otherwise their business is quiet. Shipments of plates to the railroad car builders are very light.

No announcement regarding third quarter prices has been made, and consumers generally feel that there will be no change. The market on bars is fairly well maintained at 1.65c., Pittsburgh, and this figure also applies on small lots of plates and shapes. On fair-sized tonnages producers are generally willing to shade this figure.

COLD-FINISHED STEEL BARS

Makers are willing to take third quarter contracts at 2.10c., Pittsburgh, the price which has prevailed for the last three months. However, they are not actively soliciting orders, and consumers show little disposition to sound out the market. With demand from the automobile industry considerably lighter, production in the Pittsburgh area is not higher than 25 per cent of capacity.

TUBULAR GOODS

No action has been taken on any of the larger line pipe inquiries which have been reported from time to time, although some buying is expected before the end of the month. Small orders for line pipe are in slightly better volume, and the schedules of seamless and electric weld pipe mills are more regular than heretofore. No

A Comparison of Prices

Market Prices at Date, and One Week, One Month and One Year Previous. Advances Over Past Week in Heavy Type, Declines in Italics

Pig Iron, Per Gross Ton:	June 16, 1931	June 9, 1931	May 19, 1931	June 17, 1930
No. 2 fdy., Philadelphia	$17.26	$17.26	$17.26	$19.76
No. 2, Valley furnace	17.00	17.00	17.00	18.50
No. 2 Southern, Cin'ti	14.69	14.69	14.69	16.69
No. 2, Birmingham	12.00	12.00	12.00	14.00
No. 2 foundry, Chicago*	17.50	17.50	17.50	18.50
Basic, del'd eastern Pa	17.00	17.00	17.00	18.75
Basic, Valley furnace	15.50	15.50	16.50	18.50
Valley Bessemer, del'd P'gh	18.76	18.76	18.76	20.76
Malleable, Chicago*	17.50	17.50	17.50	18.50
Malleable, Valley	17.00	17.00	17.00	19.00
L. S. charcoal, Chicago	25.04	25.04	25.04	27.04
Ferromanganese, seab'd car lots	†85.00	†85.00	†85.00	94.00

*The average switching charge for delivery to foundries in the Chicago district is 61c. per ton.

†Ferromanganese quotations adjusted to carload unit; larger quantities sold at discounts.

Rails, Billets, etc., Per Gross Ton:				
Rails, heavy, at mill	$43.00	$43.00	$43.00	$43.00
Light rails at mill	34.00	34.00	36.00	36.00
Rerolling billets, Pittsburgh	29.00	29.00	29.00	51.00
Sheet bars, Pittsburgh	29.00	29.00	29.00	31.00
Slabs, Pittsburgh	29.00	29.00	29.00	31.00
Forging billets, Pittsburgh	35.00	35.00	35.00	36.00
Wire rods, Pittsburgh	35.00	35.00	35.00	36.00
	Cents	Cents	Cents	Cents
Skelp, grvd. steel, P'gh, lb.	1.65	1.65	1.65	1.70

Finished Steel, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Bars, Pittsburgh	1.65	1.65	1.65	1.75
Bars, Chicago	1.70	1.70	1.70	1.85
Bars, Cleveland	1.65	1.65	1.65	1.75
Bars, New York	1.98	1.98	1.98	2.08
Tank plates, Pittsburgh	1.65	1.65	1.65	1.70
Tank plates, Chicago	1.70	1.70	1.70	1.80
Tank plates, New York	1.93	1.93	1.93	1.93
Structural shapes, P'gh	1.65	1.65	1.65	1.70
Structural shapes, Chicago	1.70	1.70	1.70	1.80
Structural shapes, New York	1.90½	1.90½	1.90½	1.90½
Cold-finished bars, Pittsburgh	2.10	2.10	2.10	2.10
Hot-rolled strips, Pittsburgh	1.55	1.55	1.55	1.70
Cold-rolled strips, Pittsburgh	2.15	2.15	2.15	2.45

Finished Steel, *Per Lb. to Large Buyers:*	June 16, 1931 Cents	June 9, 1931 Cents	May 19, 1931 Cents	June 17, 1930 Cents
Sheets, black, No. 24, P'gh	2.15	2.15	2.15	2.55
Sheets, black, No. 24, Chicago dist. mill	2.35	2.35	2.35	2.65
Sheets, galv., No. 24, P'gh	2.75	2.75	2.80	3.20
Sheets, galv., No. 24, Chicago dist. mill	2.85	2.90	2.90	3.30
Sheets, blue, No. 13, P'gh	2.00	2.00	2.00	2.15
Sheets, blue, No. 13, Chicago dist. mill	2.10	2.10	2.10	2.25
Wire nails, Pittsburgh	1.80	1.80	1.80	2.15
Wire nails, Chicago dist. mill	1.85	1.90	1.95	2.20
Plain wire, Pittsburgh	2.20	2.20	2.20	2.30
Plain wire, Chicago dist. mill	2.25	2.25	2.25	2.35
Barbed wire, galv., P'gh	2.55	2.55	2.55	2.80
Barbed wire, galv., Chicago dist. mill	2.60	2.60	2.60	2.85
Tin plate, 100 lb. box, P'gh	$5.00	$5.00	$5.00	$5.25

Old Material, Per Gross Ton:				
Heavy melting steel, P'gh	$10.25	$10.25	$11.25	$15.00
Heavy melting steel, Phila	9.50	9.50	9.50	12.50
Heavy melting steel, Ch'go	8.75	8.75	8.75	12.00
Carwheels, Chicago	10.00	10.00	8.75	13.50
Carwheels, Philadelphia	12.00	12.00	12.00	14.50
No. 1 cast, Pittsburgh	10.25	10.25	11.00	14.25
No. 1 cast, Philadelphia	11.50	11.50	11.50	13.00
No. 1 cast, Ch'go (net ton)	9.00	9.00	9.00	12.50
No. 1 RR. wrot., Phila	10.00	10.00	11.00	15.00
No. 1 RR. wrot., Ch'go (net)	7.00	7.50	7.50	10.00

Coke, Connellsville, Per Net Ton at Oven:				
Furnace coke, prompt	$2.40	$2.40	$2.40	$2.50
Foundry coke, prompt	3.50	3.50	3.50	3.50

Metals, *Per Lb. to Large Buyers:*	Cents	Cents	Cents	Cents
Lake copper, New York	8.37½	8.37½	9.12½	12.12½
Electrolytic copper, refinery	7.75	8.00	8.75	11.50
Tin (Straits), New York	22.75	22.45	23.50	29.50
Zinc, East St. Louis	3.40	3.25	3.35	4.45
Zinc, New York	3.75	3.60	3.70	4.80
Lead, St. Louis	3.60	3.60	3.60	5.30
Lead, New York	3.75	3.75	3.75	5.40
Antimony (Asiatic), N. Y.	6.05	6.20	6.50	7.10

On export business there are frequent variations from the above prices. Also, in domestic business, there is at times a range of prices on various products, as shown in our market reports on other pages.

change in demand for lapweld material is reported, and buttweld pipe is just about holding its own. Most producers find demand this month fully equal to the May average. Mechanical tubing reflects the lighter requirements of the automobile industry, and is very dull. Demand for boiler tubes is steady, although light.

WIRE PRODUCTS

Makers of wire are watching business in the farming sections of the West and South very closely, and many of them predict a better demand for merchant wire products as soon as crops are harvested. Present movement is very dull, but jobbers' inventories are reported to be very low for this season of the year. Manufacturers' wire is also quiet, and demand this month is falling under that of May. Nails are particularly quiet because most jobbers covered their requirements some time ago at low prices and have not been forced to come into the market since. Producers of wire have not issued schedules for third quarter, but are willing to take nail business at $1.80 a keg, and manufacturers' wire at 2.20c., Pittsburgh.

SHEETS

Despite reports from some companies that sheet orders this month are not falling far under those of May, aggregate releases have declined considerably, and operating schedules are down correspondingly. Only about a third of the industry's capacity is engaged as a general average, although production fluctuates sharply from week to week. Lighter demand is naturally more noticeable from the automobile industry, although some other lines are equally quiet. A few makers of radios have released tonnage preparatory to swinging into seasonal production, but the tendency on the part of most consuming industries is toward further curtailment in the next 30 days.

A number of independent companies have announced third quarter prices and are soliciting business on the basis of the new schedules. In the case of black sheets, this will involve an advance of $5 a ton in price, while the increase on galvanized is $3. The market on current orders is quotable at 2.15c. to 2.25c. on black sheets, and 2.75c. to 2.80c. on galvanized. On auto body, with the current market at 3c., the third quarter price has been announced as being 3.10c. Light plates and blue annealed sheets are unchanged, and will continue at present levels in the third quarter.

TIN PLATE

Releases have held up fairly well in the last week, but production is slightly lower, now being estimated at about 65 per cent of capacity. Crop reports are still favorable and the larger container manufacturers believe that the vegetable pack this year will compare favorably with that of 1930. The surplus carryover, which seemed alarmingly large a few months ago, has been liquidated and is about normal today. No formal announcement on second half prices has been made, and it is assumed in the trade that the present quotation will be carried over.

THE IRON AGE COMPOSITE PRICES

	Finished Steel	Pig Iron	Steel Scrap
June 16, 1931	2.102c. a Lb.	$15.63 a Gross Ton	$9.50 a Gross Ton
One week ago	2.102c.	15.63	9.50
One month ago	2.114c.	15.79	9.83
One year ago	2.214c.	17.50	13.17
	Based on steel bars, beams, tank plates, wire, rails, black pipe and sheets. These products make 87 per cent of the United States output.	Based on average of basic iron at Valley furnace and foundry irons at Chicago Philadelphia, Buffalo, Valley and Birmingham.	Based on No. 1 heavy melting steel quotations at Pittsburgh, Philadelphia and Chicago.

	Finished Steel High	Finished Steel Low	Pig Iron High	Pig Iron Low	Steel Scrap High	Steel Scrap Low
1931	2.142c., Jan. 13	2.102c., June 2	$15.90, Jan. 6	$15.63, May 26	$11.33, Jan. 6	$9.50, June 9
1930	2.362c., Jan. 7	2.121c., Dec. 9	18.21, Jan. 7	15.90, Dec. 16	15.00, Feb. 18	11.25, Dec. 9
1929	2.412c., April 2	2.362c., Oct. 29	18.71, May 14	18.21, Dec. 17	17.58, Jan. 29	14.08, Dec. 3
1928	2.391c., Dec. 11	2.314c., Jan. 3	18.59, Nov. 27	17.04, July 24	16.50, Dec. 31	13.08, July 2
1927	2.453c., Jan. 4	2.293c., Oct. 25	19.71, Jan. 4	17.54, Nov. 1	15.25, Jan. 11	13.08, Nov. 22
1926	2.453c., Jan. 5	2.403c., May 18	21.54, Jan. 5	19.46, July 13	17.25, Jan. 5	14.00, June 1
1925	2.560c., Jan. 6	2.396c., Aug. 18	22.50, Jan. 13	18.96, July 7	20.83, Jan. 13	15.08, May 5

STRIP STEEL

Demand this month is considerably behind that of May and seems to be getting worse. A few automobile companies are still taking strip at a fair rate, but others have curtailed their requirements markedly. Other consuming lines are inactive, and tonnage reaching mills is the poorest in many years. Most of the smaller companies are still able to operate a few turns each week, but some of them are considering every-other-week schedules. Hot-rolled strip production averages about 30 per cent of capacity, and cold-rolled 20 per cent. Some third quarter business has been taken at the recently announced prices of 1.55c. and 1.65c., Pittsburgh, on hot-rolled strip. The current market is still $1 a ton less. Cold-rolled strip is quotable at 2.15c., Pittsburgh, with sharp concessions reported from some districts.

COAL AND COKE

Despite continuance of labor trouble in the coal regions, and a tendency for the affected area to spread, the market has shown little change. In some cases coal prices are somewhat stronger at old levels, but no advances are reported. The same thing is true on coke. Foundry coke is still quotable at $3.25 to $3.50, with shading reported on occasional distress lots. Furnace coke continues at $2.40, Connellsville.

OLD MATERIAL

With no further buying of heavy melting steel in the last week, the last price paid, or $10.50, represents the top of the market. Dealers are still willing to sell at this figure and are also offering hydraulic compressed sheets at the same level. Mills are showing some interest in the market, but do not seem disposed to buy in the immediate future. On the other hand, some dealers are buying freely for yard stocks, and scrap is by no means plentiful. Production is light and low prices now in effect do not encourage preparation. A small sale of blast furnace turnings was made during the week at $7.

Prices per gross ton delivered consumers' yards in Pittsburgh and points taking the Pittsburgh district freight rate:

Basic Open-Hearth Grades:	
No. 1 heavy melting steel	$10.00 to $10.50
No. 2 heavy melting steel	9.25 to 9.75
Scrap rails	10.00 to 10.50
Compressed sheet steel	10.00 to 10.50
Bundled sheets, sides and ends	8.00 to 8.50
Cast iron carwheels	11.00 to 11.50
Sheet bar crops, ordinary	11.00 to 11.50
Heavy breakable cast	8.00 to 8.50
No. 2 railroad wrought	10.00 to 10.50
Hvy. steel axle turnings	9.00 to 9.50
Machine shop turnings	6.50 to 7.00
Acid Open-Hearth Grades:	
Railr. knuckles and couplers	12.50 to 13.00
Railr. coil and leaf springs	12.50 to 13.00
Rolled steel wheels	12.50 to 13.00
Low phos. billet and bloom ends	14.00 to 14.50
Low phos. mill plates	12.00 to 12.50
Low phos. light grades	12.00 to 12.50
Low phos. sheet bar crops	13.00 to 13.50
Heavy steel axle turnings	9.00 to 9.50
Electric Furnace Grades:	
Low phos. punchings	13.50 to 14.00
Heavy steel axle turnings	9.00 to 9.50
Blast Furnace Grades:	
Short shoveling steel turnings	6.75 to 7.25
Short mixed borings and turnings	6.75 to 7.25
Cast iron borings	6.75 to 7.25
Rolling Mill Grades:	
Steel car axles	16.50 to 17.50
Cupola Grades:	
No. 1 cast	10.00 to 10.50
Rails 3 ft. and under	12.50 to 13.00

Warehouse Prices, f.o.b. Pittsburgh

	*Base per Lb.
Plates	2.85c.
Structural shapes	2.85c.
Soft steel bars and small shapes	2.60c.
Reinforcing steel bars	2.60c.
Cold-finished and screw stock—	
Rounds and hexagons	3.35c.
Squares and flats	3.85c.
Bands	2.95c.
Hoops	3.95c.
Black sheets (No. 24), 25 or more bundles	3.05c.
Galv. sheets (No. 24), 25 or more bundles	3.40c.
Light plates, blue annealed (No. 10)	2.75c. to 3.00c.
Blue annealed sheets (No. 13),	2.90c. to 3.00c.
Galv. corrug. sheets (No. 28), per square (less than 3750 lb.)	3.74c.
Spikes, large	2.65c.
Small	2.90c. to 3.05c.
Boat	3.15c.
Track bolts, all sizes, per 100 count,	60 and 10 per cent off list
Machine bolts, 100 count,	60 and 10 per cent off list
Carriage bolts, 100 count,	60 and 10 per cent off list
Nuts, all styles, 100 count,	60 and 10 per cent off list
Large rivets, base per 100 lb.	$3.20
Wire, black, soft ann'l'd, base per 100 lb.	2.30
Wire, galv. soft, base per 100 lb.	2.75
Common wire nails, per keg	2.05
Cement coated nails, per keg	2.05

*On plates, structurals, bars, reinforcing bars, bands, hoops and blue annealed sheets, base applies to orders of 400 to 999 lb.

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Two towboats, pushing five loaded barges, left St. Louis June 12 for Peoria, Ill., to inaugurate the new barge service between those two points. The cargo of the boats on the initial trip was composed of pineapples that came through the Panama Canal from Hawaii, coffee that was shipped from South America and sugar refined in Louisiana, besides a number of carloads of merchandise from St. Louis merchants.

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Monarch Machine Tool Co., Sidney, Ohio, has opened a Chicago office and showroom at 547 West Washington Boulevard, in charge of Martin J. Luther.

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Land, buildings and equipment of Universal Machine Co., Bowling Green, Ohio, will be sold at public auction Thursday, June 25, starting at 10.30 a. m., by Industrial Plants Corpn., Columbus, Ohio.

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The Government has awarded a contract to the Electric Boat Co., Groton, Conn., for a submarine boat to cost $3,297,000. When work on this craft is started, the company will take on 300 additional workmen, bringing its personnel up to about 600.

CHICAGO

Steel Production Continues to Decline Slowly as Buying Falls Off

CHICAGO, June 16.—The drift downward in steel demand is still in evidence, and most indicators point to still lower shipments during the next month or two. There is an almost total lack of interest in third quarter commitments for many obvious reasons. Except in sheets, there appear to be no general moves toward price advances. Producers are meeting the exacting requirements of consumers with only occasional delay and transportation facilities are working smoothly. Further, there is a fast growing movement to suspend many industrial operations during July, this being a necessity in some cases, while in others it seems to be a deliberate attempt to force further liquidation of stocks and to create an accumulation of demand in the hope that added momentum will be given to business in the early fall. Sentiment, whether right or wrong, no longer expects an even business keel this summer, but is raising hopes for a turn for the better in the last three or four months of the year.

Inquiries for iron and steel for third quarter deliveries are scarce, and current buying gradually grows lighter. Specifications are no longer able to support output above 38 to 40 per cent of capacity. With rail production trending below the 30 per cent mark, prospects are not bright that the present rate of ingot production will be held.

On the brighter side of the market are orders for 500 steel box cars, an inquiry for 800 underframes and 400 tunnel cars and a potential inquiry for 800 to 1000 refrigerator cars. The Western structural market has also experienced another good week.

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Ingot production droops further, now ranging from 38 to 40 per cent for district.

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Little or no interest among consumers in third quarter requirements.

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Chicago sheet producers announce new prices, involving some advances, for coming quarter.

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Many plant shutdowns in July among both steel companies and their customers are in prospect.

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Structural steel brightest spot in market. Some railroad equipment inquiries appear.

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PIG IRON

Interest in third quarter iron seems to be mostly as to prices. A few scattered sales of iron that is said to have come from Chicago district steel mills have been made at Milwaukee at 50c. under the market, but local merchant furnaces and the one steel unit that is openly in the market are holding quotations at $17.50 a ton, base, local furnace. A few quiet inquiries for the coming quarter are before the trade and several purchases have been made, but there is as yet no broad movement to cover. The situation in Southern iron is much the same as in Northern iron. Many consumers bought rather heavily when prices were at lower levels and much of this tonnage is being carried over after July 1. Movement of charcoal iron is holding relatively steady, but interest in future needs is at low ebb. Releases of silvery are remarkably steady in view of the market as a whole, and quite a few small purchases have been made in recent days.

Prices per gross ton at Chicago:

N'th'n No. 2 fdy., sil. 1.75 to 2.25	$17.50
N'th'n No. 1 fdy., sil. 2.25 to 2.75	18.00
Malleable, not over 2.25 sil.	17.50
High phosphorus	17.50
Lake Super. charcoal, sil. 1.50	$25.04 to 27.04
S'th'n No. 2 fdy.	17.01
Low phos., sil. 1 to 2, copper free	28.50 to 29.20
Silvery, sil. 8 per cent	24.79 to 26.79
Bess. ferrosilicon, 14-15 per cent	35.79

Prices are delivered consumers' yards except on Northern foundry, high phosphorus and malleable, which are f.o.b. local furnace, not including an average switching charge of 61c. per gross ton.

FERROALLOYS

Consumers' interest is confined to rather meager specifications. A few small transactions in spiegeleisen have recently been closed.

COKE

This market is quiet, with quotations steady at $7.50 a ton, local ovens. Shipments have been gradually growing lighter, and new specifications point to further recession in use.

SHEETS

Producers in this district are falling in line with announcements of new sheet prices for the third quarter. Chicago mill prices for No. 10 hot-rolled sheets will be 1.95c. a lb.; No. 24 galvanized will be quoted at 3c., whereas the market at present has settled to 2.85c.; No. 24 hot-rolled annealed sheets will be quoted at 2.50c., whereas black sheets are now selling at 2.35c. Both current and future buying are stagnant and specifications are very spotty. Output is in the range from 40 to 45 per cent of capacity.

Base prices per lb., deliv'd from mill in Chicago: No. 24 black sheets, 2.40c. to 2.50c.; No. 24 galv., 2.95c. to 3.05c.; No. 10 blue ann'l'd, 2.00c. to 2.10c. Deliv'd prices at other Western points are equal to the freight from Gary, plus the mill prices, which are 5c. per 100 lb. lower than Chicago delivered prices.

CAST IRON PIPE

Requirements in this district continue to grow lighter, in spite of the assertion of sellers earlier in the year that a fair number of projects would come out for figures in the early summer. The slow pace of this market is not confined to large tonnage business, but also to orders and inquiries for carloads and less. The only award of note this week is 1150 tons of 4 to 12-in. Class C pipe placed by Fox Point, Wis., with the Alabama Pipe Co. The price was $34.50 a ton, Birmingham, or $42.90 a ton, delivered. Fresh inquiries are very scarce. New business may soon develop in several Lake shore towns north of Chicago, where sewage disposal plants are being planned.

Prices per net ton, deliv'd Chicago: Water pipe, 6-in. and over, $42 to $44; 4-in., $45 to $47; Class A and gas pipe, $3 extra.

WIRE PRODUCTS

Use of wire products continues to slacken in practically all directions, and producers have adjusted output to a range from 30 to 35 per cent of capacity. Jobbers in the agricultural districts have found the greatest recession in use. This is not a wholly unexpected condition at this time of year, and these distributers are looking hopefully to the end of the harvest season. The manufacturing trade, though operating lighter than at the first of the month, is making adjustments very slowly. The outlook for electrical cables appears somewhat more encouraging. A Chicago consulting engineer has booked a large job for east Texas, and has more good prospects than at any time so far this year. Although third quarter books are open, there is little interest in future requirements.

RAILS AND TRACK SUPPLIES

Output continues to taper. Local rail mills are not operating above 30 per cent of capacity. A few small lots of rails and several small orders for track supplies have reached producers' books.

WAREHOUSE BUSINESS

Price reductions of $3 to $5 a ton are in effect at Chicago warehouses. Quotations on plates and shapes are unaltered, but reductions are current on bars, bands hoops and sheets. Distribution from warehouses is gradually growing lighter. This situation is more noticeable in the city, where

price changes were first made known, than in the country.

BOLTS, NUTS AND RIVETS

Although third quarter contracting is making headway, sellers are finding greater resistance to prices, which are somewhat less stable than formerly. Specifications continue to drop, due in some measure to the probability that many industrial plants will be idle during most, if not all, of July. A large tractor manufacturer is preparing to bring out a new type machine which will probably go into production some time late in the summer.

REINFORCING BARS

The building situation in and around Chicago remains backward. This condition is more noticeable in projects requiring large tonnages of bars than on jobs taking up to 100 tons each. Use of reinforcing bars for road work, however, is heavy. Wisconsin will use 2000 tons for crossovers. Illinois will have a letting this week and another one next week. Bids are in on a round tonnage for Illinois bridges. Road contractors have placed 500 tons with dealers and a mill has added 300 tons to its books. Prices remain variable. Billet reinforcing bars out of warehouses are weak and quotations on rail steel bars for road work drop when shipments are made outside of the territory where freight rates favor Chicago.

PLATES

Demand for plates in the Western market remains light, and there is little in view by which the future can be gaged. One pipe maker is said to have a large tonnage of finished product in storage, but this is not as disturbing as might be supposed, for the reason that construction crews must be assured of a steady flow of pipe, and inequalities in production must be ironed out by ample stocks at production centers. There is a momentary lull in news concerning pipe programs in the Middle West, but word comes from the Pacific Coast that several new plans are taking shape in that territory. The market for tanks is listless, but there is a ray of hope in the east Texas fields, where proration is gradually becoming more orderly. It was this field that a few weeks ago gave promise of needing additional storage facilities.

The eyes of all steel producers are centered on the plea of the railroads for an advance in rates. The thought is generally expressed that, if successful, this move will do much to broaden the credit of the railroads and bring them back into the market as impressive buyers. There can be little doubt that needed repairs are fast piling up and that under present conditions the railroads are losing ground in maintenance work. Specifications from railroad shops give unquestionable proof of a low rate of operations.

Although there has been some talk of higher price for plates that are to be delivered in the third quarter, such a move has not been made by local producers.

STRUCTURAL MATERIAL

This market is enlivened by awards of more than 10,000 tons and by inquiries for 6000 tons, with the possibility that this figure may be increased to 20,000 tons. A hotel at Oklahoma City, requiring 3500 tons, is the largest single letting. Then comes a race track pavilion in Chicago, which will take 2000 tons. Inquiries are not individually large and are well scattered over a wide territory. Of special interest is a potential inquiry for 14,000 tons for a tower building to be included in the World's Fair group. Plans are to have a 1600-ft. tower as part of a structure that can come into permanent use as a convention hall. The uncertainty that overhangs this project is the present regulation as to height of structures that can be erected in the section to be occupied by the fair. Shop operations are still well below normal for this time of year, and inquiries at hand promise nothing much better during the summer. In the reference last week to the Bethlehem H sections it should have been stated that they would henceforth be rolled with no slope on the inside of the flanges.

BARS

Like the demand for other finished steel products, the use of bars is gradually sinking to lower levels. Output on the whole is little, if any, above 40 per cent of capacity. The mill that a week ago was producing above 50 per cent of capacity is now operating at about 45 per cent. The greatest drop in specifications is from the automobile industry. General manufacturing, though somewhat lighter, is taking a more gradual downward course. Prices for all bar mill products are reasonably steady, and the impression is general that present quotations will be carried into the third quarter.

A marked change in the attitude of rail steel bar consumers has resulted in a sharp reduction in rolling schedules, the average now being 50 per cent of capacity, whereas it was close to 70 per cent a few weeks ago. On the other hand, the recent furniture exhibit at Chicago was a marked success, and orders taken have already resulted in new business for rail steel bar mills.

OLD MATERIAL

It is difficult to find any basic change in the local scrap iron and steel market. There are a few adjustments in prices, but these have no significance beyond the alinement of these grades with the market as a whole. Steel mills, having somewhat less use for heavy melting steel, are restricting their specifications and, as a result, rejections are more numerous. Dealers, with a limited supply from which to draw, are finding this situation a hardship and are anxious to see higher prices, which will induce a more liberal flow of material from a wider territory.

Prices deliv'd Chicago district consumers:

	Per Gross Ton	
Basic Open-Hearth Grades:		
Heavy melting steel	$8.50 to	$9.00
Shoveling steel	8.50 to	9.00
Frogs, switches and guards, cut apart, and misc. rails	8.50 to	9.00
Factory hyd. comp. sheets	7.00 to	7.50
Drop forge flashings	6.00 to	6.50
No. 1 busheling	6.75 to	7.25
Forg'd cast and r'l'd steel carwheels	10.50 to	11.00
Railroad tires, charg. box size	11.50 to	12.00
Railroad leaf springs cut apart	11.00 to	11.50
Axle turnings	7.00 to	7.50
Acid Open-Hearth Grades:		
Steel couplers and knuckles	9.75 to	10.25
Coil springs	11.50 to	12.00
Electric Furnace Grades:		
Axle turnings	7.50 to	8.00
Low phos. punchings	10.75 to	11.25
Low phos. plates, 12 in. and under	10.50 to	11.00
Blast Furnace Grades:		
Cast iron borings	3.75 to	4.00
Short shoveling turnings	3.50 to	4.00
Machine shop turnings	3.50 to	4.00
Rolling Mill Grades:		
Rerolling rails	10.50 to	11.00
Cupola Grades:		
Steel rails, less than 3 ft.	10.50 to	11.00
Steel rails, less than 2 ft.	11.00 to	11.50
Angle bars, steel	9.75 to	10.25
Cast iron carwheels	10.00 to	10.50
Malleable Grades:		
Railroad	9.50 to	10.00
Agricultural	9.00 to	9.25
Miscellaneous:		
*Relaying rails, 56 to 60 lb.	19.00 to	21.00
*Relaying rails, 65 lb. and heavier	22.00 to	27.00
	Per Net Ton	
Rolling Mill Grades:		
Iron angle and splice bars	9.00 to	9.50
Iron arch bars and transoms	10.50 to	11.00
Iron car axles	17.50 to	18.50
Steel car axles	11.50 to	12.00
No. 1 railroad wrought	7.00 to	7.50
No. 2 railroad wrought	7.50 to	8.00
No. 1 busheling	6.00 to	6.50
No. 2 busheling	4.00 to	4.50
Locomotive tires, smooth	11.50 to	12.50
Pipes and flues	5.50 to	6.00
Cupola Grades:		
No. 1 machinery cast	9.00 to	9.50
No. 1 railroad cast	8.00 to	8.50
No. 1 agricultural cast	7.00 to	7.50
Stove plate	6.25 to	6.75
Grate bars	5.50 to	6.00
Brake shoes	5.50 to	6.00

*Relaying rails, including angle bars to match, are quoted f.o.b. dealers' yards.

Warehouse Prices, f.o.b. Chicago

	Base per Lb.
Plates and structural shapes	3.00c.
Soft steel bars	2.75c.
Reinforcing bars, billet steel	1.65c. to 2.00c.
Rail steel reinforcement—	
For buildings	1.45c. to 1.65c.
Highway slabs	1.65c.
For bridges and culverts	1.75c.
Cold-fin. steel bars and shafting—	
Rounds and hexagons	3.10c.
Flats and squares	3.60c.
Bands, 7/8 in. (in Nos. 10 and 12 gages)	2.95c.
Hoops (No. 14 gage and lighter)	3.50c.
Black sheets (No. 24)	3.55c.
Galv. sheets (No. 24)	4.10c.
Blue ann'l'd sheets (No. 10)	3.20c.
Spikes (7/8 in. and larger)	3.45c.
Track bolts	4.30c.
Rivets, structural	4.00c.
Rivets, boiler	4.00c.
	Per Cent Off List
Machine bolts	60 and 10
Carriage bolts	60 and 10
Coach and lag screws	60 and 10
Hot-pressed nuts, sq., tap. or blank,	60 and 10
Hot-pressed nuts, hex., tap. or blank,	60 and 10
No. 8 black ann'l'd wire, per 100 lb.	$3.45
Com. wire nails, base per keg	2.30
Cement c't'd nails, base per keg	2.30

CLEVELAND — Decline in Steel Orders Brings Operations Down to 38 Per Cent

CLEVELAND, June 16.—Demand for finished steel continues on the decline, and some feel that the bottom has about been reached. However, there is little, if any, expectation that the market will take a turn for the better before August at the earliest. Much of the decline in steel demand is due to lessened requirements of the automobile industry. While the production schedules of the motor car companies for July are uncertain, it is believed that a later turn for the better in the steel market will be due in considerable measure to an upward swing in automobile tonnage.

There was a further decline in steel plant operations in Cleveland this week through the shutting down of the two open-hearth furnaces that were being operated by a company that depends on the motor car industry for much of its business. Only 13 furnaces are now operating in Cleveland, or 38 per cent of ingot capacity, a loss of six points for the week. The finishing mills of this company are also shut down this week.

Steel consumers, with scarcely an exception, are buying only in very small lots for immediate needs. Very few consumers in the manufacturing field are showing much activity and some report a seasonal slowing down in their business. Interest is lacking in third quarter prices and contracts. Some inquiry for sheet contracts evidently has been made to sound out the market. New sheet classifications, involving advances on grades now classed as black sheets, and the proposed advance on hot-rolled strip have not been tested by sizable orders. Current prices on wire products have been continued for third quarter business, and it is expected that no change will be made in steel bars, plates and shapes for that delivery.

PIG IRON

Demand is of a hand-to-mouth character, and sales are limited to small lots. No inquiry of size is pending, and no interest is being shown in third quarter contracts. Prices are steady, but there have been no orders recently of sufficient size to furnish a test. Shipments during the first half of June held closely to those in the corresponding period in May, but a falling off is expected during the remainder of the month because releases from the motor car industry have been scaled down. Prices are unchanged at $16 to $17, Lake furnace, for foundry and malleable iron for Ohio and Indiana shipment, $17 to $17.50 for Michigan, and $17, furnace, for Cleveland delivery.

Prices per gross ton at Cleveland:

N'th'n fdy., sil. 1.75 to 2.25	$17.00
S'th'n fdy., sil. 1.75 to 2.25	17.01
Malleable	17.50
Ohio silvery, 8 per cent	25.00
Stand. low phos., Valley	27.00

Prices are f.o.b. furnace except on Southern foundry and silvery iron. Freight rates: 50c. average local switching charge; $3 from Jackson, Ohio; $6.01 from Birmingham.

BARS, PLATES AND SHAPES

Specifications for structural shapes, largely for bridge work, are holding up fairly well. Demand for bars is very light from the automobile as well as other consuming industries. There is very little activity in plates. Little new structural work is coming out. Bids for the Addressograph-Multigraph Corpn. plant in Cleveland, requiring 2000 tons, were taken today by the general contractor. Prices are steady at 1.70c., Cleveland, for steel bars for local delivery, 1.65c. for out-of-town shipment and 1.65c., Pittsburgh, for plates and shapes, although a large inquiry for the latter products probably would bring out a concession.

WIRE PRODUCTS

A leading manufacturer has announced that its present prices will continue through the third quarter. New demand for manufacturers' wire from bolt and nut manufacturers and other consumers is very light.

SHEETS

With the slowing down of the automotive industry and a seasonal decline in the demand from some consumers in the stove, refrigerator and metal furniture fields, there is a further slight decline in the volume of business. Orders are confined to very small lots. Several mills have about discontinued making quotations under the old classification, having announced that they will take no orders on the old basis that cannot be shipped by June 30. Others will take business under the present schedules through June. The Fisher Body Corpn., which has been buying sheets early in the month for about 30 days' requirements for making Chevrolet bodies in its Cleveland plant, has limited its purchases so far this month to comparatively small lots for filling in. The more favorable aspect of the market is that stamping companies are figuring on more inquiries for stampings than for some time. With mills getting ready to place the new classification in effect, not much interest is being shown in current prices.

STRIP STEEL

Demand for hot-rolled strip shows further recession. Some consumers in the automotive field evidently are uncertain of their operations during the next 30 days and are buying in smaller lots than recently. Little interest is being shown in third quarter contracts, and the $1 a ton advance to 1.55c., Pittsburgh, for wide strip and 1.65c. for narrow has not been tested. Some small-lot current orders are being taken at these prices, although most business is going at $1 a ton lower. Cold-rolled strip is inactive, with a price spread of 2.15c. to 2.25c., Cleveland.

OLD MATERIAL

Prices on steel-making grades further declined 50c. to $1 a ton the past week. The new weakness in the local market is due at least in part to the shutting down of the open-hearth plant of the Otis Steel Co., which had previously got down to two furnaces operating. This company, which had been taking some scrap, has shut off entirely on shipments. Prices on other grades are nominal.

Prices per gross ton delivered consumers' yards:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel	$8.50 to	$9.00
No. 2 heavy melting steel	8.00 to	8.50
Compressed sheet steel	7.50 to	8.00
Light bundled sheet stampings	6.50 to	7.00
Drop forge flashings	6.75 to	7.00
Machine-shop turnings	5.00 to	5.50
Short shoveling turnings	6.25 to	6.75
No. 1 railroad wrought	9.50 to	10.00
No. 2 railroad wrought	10.00 to	10.50
No. 1 busheling	6.75 to	7.00
Pipes and flues	5.50 to	6.00
Steel axle turnings	7.50 to	8.00
Acid Open-Hearth Grades:		
Low phos., billet bloom and slab crops	14.00 to	14.50
Blast Furnace Grades:		
Cast iron borings	6.25 to	6.75
Mixed borings and short turnings	6.25 to	6.75
No. 2 busheling	6.00 to	6.25
Cupola Grades:		
No. 1 cast	10.00 to	10.50
Railroad grate bars	6.00 to	6.50
Stove plate	6.00 to	6.50
Rails under 3 ft	15.00 to	15.50
Miscellaneous:		
Rails for rolling	13.00 to	13.50
Railroad malleable	11.00 to	11.25

Warehouse Prices, f.o.b. Cleveland

	Base per Lb.
Plates and struc. shapes	2.95c.
Soft steel bars	2.75c.
Reinforc. steel bars	1.75c. to 1.95c.
Cold-fin. rounds and hex	3.40c.
Cold-fin. flats and sq	3.90c.
Hoops and bands, No. 12 to $\frac{1}{16}$ in., inclusive	3.00c
Hoops and bands, No. 13 and lighter	3.55c.
Cold-finished strip	*5.55c.
Black sheets (No. 24)	3.60c.
Galvanized sheets (No. 24)	4.00c.
Blue ann'l'd sheets (No. 10)	3.00c
No. 9 ann'l'd wire, per 100 lb	$2.35
No. 9 galv. wire, per 100 lb	2.80
Com. wire nails, base per keg	2.25

*Net base, including boxing and cutting to length.

NEW YORK

Mills Naming Higher Sheet Prices for Third Quarter—Pig Iron Dull

NEW YORK, June 16.—Inquiry for pig iron is exceedingly light, aggregate tonnage pending amounting only to 2000 tons, half of which is for delivery to a New England melter. Sales in this district totaled 2500 tons, slightly less than in the week previous. The largest single order was for 600 tons, the remainder of the tonnage comprising small lots for early shipment. American Locomotive Co. is reported to have placed an order with a Buffalo furnace for 150 tons of iron with silicon 3.25 to 3.75 per cent for its Schenectady, N. Y., plant. The featureless market has brought no new developments in prices.

Prices per gross ton, delivered New York district:

Buffalo No. 2 fdy., sil. 1.75 to 2.25	$19.91 to $20.41
*Buff. No. 2, del'd east. N. J.	18.28 to 18.78
East. Pa. No. 2 fdy., sil. 1.75 to 2.25	17.39 to 17.89
East. Pa. No. 2X fdy., sil. 2.25 to 2.75	17.89 to 18.39

Freight rates: $4.91 from Buffalo, $1.39 to $2.52 from eastern Pennsylvania.
*Prices delivered to New Jersey cities having rate of $3.28 a ton from Buffalo.

CAST IRON PIPE

New inquiry for pressure pipe involves about 2000 tons, including 1000 tons of 10 to 14-in. centrifugal pipe for Ticonderoga, N. Y., and 300 tons of large sizes for Jersey City. Among recent awards are 1000 tons of 6 to 12-in. for Yorktown Heights, N. Y., which is reported to have been placed with R. D. Wood & Co., and another contract for 100 tons, various sizes up to 12 in., for delivery at Newburgh, N. Y., to the same maker. A contract involving 500 tons of 8 to 10-in. was awarded by Allentown, Pa. A contract for 3500 tons of 16-in. and larger pipe probably will be awarded this week. The 1500 tons inquired for by Newcastle, N. Y., is still pending. Prices remain practically unchanged.

Prices per net ton deliv'd New York: Water pipe, 6-in. and larger, $33.90 to $35.90; 4-in. and 5-in., $36.90 to $38.90; 3-in., $43.90 to $45.90. Class A and gas pipe, $3 extra.

FINISHED STEEL

Interest centers in the efforts of sheet mills to establish the new classification and new base prices. There appears to be no serious objection on the part of consumers to the new classification, but there is some question of the new base price of 2.40c. a lb., Pittsburgh, on hot-rolled annealed sheets, the new designation for black sheets. As this is an increase of $5 a ton over prevailing quotations for shipments this month, some consumers have questioned the ability of the mills to establish the advance. Some mills, however, are taking a firm stand, which is strengthened by their own belief that business is not going to be plentiful during the next two or three months and that no more tonnage will be obtained if they show signs of weakening on prices. Although specifications against second quarter contracts will be accepted by most mills up to June 30 for shipment before July 31, they are now insisting on the new prices on both contract business and specific orders for shipment after June 30. Except on sheets and on hot-rolled strip steel, on which an advance of $1 a ton is being asked for third quarter, no price changes appear to be in prospect. On plates, shapes and bars, current quotations probably will be reaffirmed for the third quarter. Most of the makers of the heavy hot-rolled products, however, are deferring announcements, as there is no particular interest among their customers in new contracts.

The Bethlehem Steel Co. is now receiving shipping instructions against a recent order for 10,000 tons of subway rails for the Board of Transportation, New York, and on 5000 tons of rails for the Lehigh Valley Railroad, for which an order was received a few weeks ago. Outstanding in prospective structural steel inquiries is 22,000 tons for the Union Inland Freight Terminal, to be built by the Port of New York Authority between Eighth and Ninth Avenues and Fifteenth and Sixteenth Streets, New York.

REINFORCING BARS

A range of 1.60c. to 1.65c. a lb., Pittsburgh, or 1.93c. to 1.98c., New York, is being maintained on most current business, but concessions are granted on the larger contracts. While a substantial tonnage of reinforced concrete projects is pending, new business this week was decidedly small, the only sizable tonnage being in a new section of the overhead highway in New Jersey.

COKE

The coal strike in western Pennsylvania and West Virginia has not yet proved an important factor in the coke market. With most consumers contracted for their last half requirements and with reduced operating schedules generally in effect, the consuming trade continues to view the strike with apparent unconcern. Keystone Coal & Coke Co., Greensburg, Pa., has reduced its price on beehive foundry coke from $4.85 a net ton, ovens, to $4.50, ovens. Current coke quotations are as follows:

Special brands of beehive foundry coke, $4 to $4.50 a net ton, ovens, or $7.71 to $8.56, delivered to northern New Jersey, Jersey City and Newark, and $8.59 to $9.43 to New York and Brooklyn; by-product foundry coke, $8.70 to $9.10, Newark or Jersey City; $9.76, New York or Brooklyn.

OLD MATERIAL

Offering prices of brokers and dealers continue to decline, with a good supply of most grades available and consumers refraining from purchasing. A consumer of No. 1 heavy melting steel at Claymont, Del., has resumed acceptance of deliveries on old contracts, and brokers are offering $8 a ton, delivered, to complete their orders. Buying prices on other grades are off 25c. to 50c. a ton. In a few instances, dealers have been accumulating certain of the better grades of scrap as stock in their yards, evidently believing that the present price level offers a substantial future profit.

Dealers' buying prices per gross ton, f.o.b. New York:

No. 1 heavy melting steel	$4.50 to	$6.50
Heavy melting steel (yard)	3.25 to	3.75
No. 1 hvy. breakable cast		6.50
Stove plate (steel works)	3.75 to	4.00
Locomotive grate bars	3.75 to	4.00
Machine shop turnings		2.00
Short shoveling turnings		2.00
Cast borings (blast fur. or steel works)		2.25
Mixed borings and turnings	1.75 to	2.00
Steel car axles	12.00 to	12.50
Iron car axles	16.50 to	17.00
Iron and steel pipe (1 in. dia., not under 2 ft. long)	6.00 to	6.25
Forge fire	4.50 to	5.00
No. 1 railroad wrought		8.25
No. 1 yard wrought, long		7.25
Rails for rolling	6.00 to	6.50
Stove plate (foundry)		4.50
Malleable cast (railroad)	7.50 to	8.00
Cast borings (chemical)	8.00 to	8.50

Prices per gross ton, deliv'd local foundries:

No. 1 machry. cast	$12.00 to	$12.50
No. 1 hvy. cast (columns, bldg. materials, etc.; cupola size)	10.00 to	10.50
No. 2 cast (radiators, cast boilers, etc.)	9.50 to	10.00

Warehouse Prices, f.o.b. New York

	Base per Lb.
Plates and struc. shapes	2.70c. to 3.10c.
Soft steel bars, small shapes	2.70c. to 3.10c.
Iron bars	3.24c.
Iron bars, Swed. charcoal	7.00c. to 7.25c.
Cold-fin. shafting and screw stock—	
Rounds and hexagons	3.40c.
Flats and squares	3.90c.
Cold-roll. strip, soft and quarter hard	4.95c.
Hoops	3.75c.
Bands	3.40c.
Blue ann'l'd sheets (No. 10)	3.00c. to 3.25c.
Black sheets (No. 24*)	3.50c.
Galvanized sheets (No. 24*)	4.00c.
Long terne sheets (No. 24)	5.00c.
Standard tool steel	12.00c.
Wire, black annealed	4.50c.
Wire, galv. annealed	5.15c.
Tire steel, ½ x ½ in. and larger	3.40c.
Smooth finish, 1 to 2½ x ¼ in. and larger	3.75c.
Open-hearth spring steel, bases,	4.50c. to 7.00c.

*No. 28 and lighter, 36 in. wide, 20c. higher per 100 lb.

	Per Cent Off List
Machine bolts, cut thread:	
¾ x 6 in. and smaller	65 to 65 and 10
1 x 30 in. and smaller	65 to 65 and 10
Carriage bolts, cut thread:	
½ x 6 in. and smaller	65 to 65 and 10
¾ x 20 in. and smaller	65 to 65 and 10
Boiler Tubes:	Per 100 Ft.
Lap welded, 2-in.	$19.00
Seamless steel, 2-in.	20.25
Charcoal iron, 2-in.	26.25
Charcoal iron, 4-in.	67.00

PHILADELPHIA

Steel Operations Lower—Inquiry for Tanks Active

PHILADELPHIA, June 16.—While sentiment continues to show a slight improvement, the volume of steel and pig iron buying is even smaller than in recent weeks. Operating rates of eastern Pennsylvania mills show a further slight recession, averaging slightly better than 35 per cent of capacity, with the leading independent at about 40 per cent.

Sheet mills are generally adopting the new classification for sheets, to be effective on third quarter business, but continue to quote on the former basis for business taken up to the end of this month. Consumers appear to be satisfied with the new method of selling sheets, but are endeavoring to obtain lower quotations than the new base prices.

Much of the fabricated steel business in prospect is in tank construction. In addition to 12 storage tanks for erection in eastern Pennsylvania, requiring about 500 tons of plates, the Atlantic Refining Co. is taking bids on four tanks for the South, requiring about 200 tons. The Sun Oil Co. has not yet closed on storage tanks requiring 400 to 500 tons of plates, and the United Gas Improvement Co. is about to place a contract for a 10,000,000 cu. ft. gas holder, for erection in Philadelphia, which calls for about 4000 tons of plates.

PIG IRON

Eastern Pennsylvania foundry iron is generally quoted at $16.50 a ton, furnace, with the greater part of present buying still limited to carload lots for prompt shipment. Occasionally No. 2X foundry is sold at a 25c. extra for silicon instead of the usual 50c. differential. Southern pig iron sellers are maintaining $11 a ton, Birmingham, on foundry iron, and current shipments to eastern Pennsylvania consumers are in general limited to small lots, not likely to bring a concession in price. Basic iron is quiet, except for deliveries on old contracts, including continued arrivals of Indian basic iron for eastern Pennsylvania users.

Prices per gross ton at Philadelphia:

East. Pa. No. 2, 1.75 to 2.25 sil.	$17.26
East. Pa. No. 2X, 2.25 to 2.75 sil.	17.76
East. Pa. No. 1X	18.26
Basic (del'd east. Pa.)	$17.00 to 17.25
Malleable	19.00 to 20.00
Stand. low phos. (f.o.b. east. Pa. furnace)	23.00 to 24.00
Cop. b'r'g low phos. f.o.b. furnace)	22.00 to 23.00
Va. No. 2 plain, 1.75 to 2.25 sil.	22.29
Va. No. 2X, 2.25 to 2.75 sil.	22.79

Prices, except as specified otherwise, are deliv'd Philadelphia. Freight rates: 76c. to $1.64 from eastern Pennsylvania furnaces; $4.54 from Virginia furnaces.

STEEL BARS

Buying is limited to small lots, usually a carload or smaller, and 1.65c., Pittsburgh, or 1.94c., Philadelphia, is firm on such business. Billet steel reinforcing bars are 1.60c. to 1.65c., Pittsburgh, or 1.89c. to 1.94c., Philadelphia, with concessions of $1 and more a ton on the larger contracts. Rail steel bars are offering competition at present price levels, being quoted at 1.20c. to 1.30c., Pittsburgh, or 1.49c. to 1.54c., Philadelphia. Of recent reinforcing bar awards, a Post Office in Camden, N. J., requiring 300 tons of bars, and an addition to a prison in Holmesburg, Pa., requiring less than 100 tons of bars, went to rail steel bar sellers. Bids have been taken for a sewer at Mingo Creek in South Philadelphia, requiring about 300 tons of bars.

SHAPES

Mill operating rates are only slightly in excess of 35 per cent in most cases, ranging up to 40 per cent in the case of the leading independent. Prices, however, are maintained at 1.70c. to 1.75c. a lb., f.o.b., nearest mill to consumer, or 1.76c. to 1.81c., Philadelphia; occasionally 1.80c., mill, or 1.86c., Philadelphia, is quoted on small lots and miscellaneous specifications.

PLATES

Fabricators of tanks are bidding on a fair tonnage of business with the Atlantic Refining Co., Sun Oil Co. and the United Gas Improvement Co. On four oil tanks for erection in the South by the Atlantic Refining Co., only Southern fabricators are being asked to submit bids, and in consequence the plates are expected to go to a Southern mill. Plate prices are unchanged at 1.75c., Coatesville, Pa., or 1.85½c., Philadelphia, on small lots, and 1.70c., Coatesville, or 1.80½c., Philadelphia, on the more desirable tonnages.

Warehouse Prices, f.o.b. Philadelphia

	Base per Lb.
Plates, ¼-in. and heavier	2.50c.
Structural shapes	2.50c.
Soft steel bars, small shapes, iron bars (except bands)	2.60c.
Reinforc. steel bars, sq., twisted and deform	2.50c. to 2.60c.
Cold-fin. steel, rounds and hex	3.40c.
Cold-fin. steel, sq. and flats	3.90c.
Steel hoops	3.15c.
Steel bands, No. 12 to ⅛-in. inclu.	2.90c.
Spring steel	5.00c.
*Black sheets (No. 24)	3.40c.
†Galvanized sheets (No. 24)	3.85c.
Light plates, blue annealed (No. 10)	3.05c.
Blue ann'l'd sheets (No. 13)	3.20c.
Diam. pat. floor plates, ¼-in.	5.20c.
Swedish iron bars	6.60c.

*For 50 bundles or more; 10 to 49 bun., 3.65c. base; 1 to 9 bun., 3.90c. base.
†For 50 bundles or more; 10 to 49 bun., 4.20c. base; 1 to 9 bun., 4.55c. base.

SHEETS

Consumers of sheets in this district are maintaining operations of recent weeks with but little curtailment, except in the case of automobile body manufacturers, which have reduced production schedules. Sheet metal contractors are beginning to book some small contracts for repairs and other work at industrial plants, a type of work which has been decidedly restricted in recent months. Mills are now quoting sheets for prompt shipment on the old classification and for delivery next month on the new bases.

IMPORTS

In the week ended June 13, 5060 tons of manganese ore arrived at this port from Brazil, and 35 tons of ferrochrome was received from Switzerland. Pig iron imports totaled 4004 tons from British India. Steel imports consisted of 190 tons of structural shapes from Belgium and 155 tons from France, 36 tons of steel plates and 55 tons of bars from Belgium and one ton of band iron from Germany.

OLD MATERIAL

Scrap transactions are generally limited to sales of distress lots of a carload or more. The consumer at Claymont, Del., has temporarily resumed acceptance of deliveries on old contracts for No. 1 heavy melting steel, on which about 2000 tons of material is understood to be still due from brokers to complete the contracts. Other grades are quiet and prices are nominal.

Prices per gross ton delivered consumers' yards, Philadelphia district:

No. 1 heavy melting steel	$9.00 to $10.00
No. 2 heavy melting steel	7.00 to 7.50
Heavy melting steel (yard)	6.50 to 7.00
No. 1 railroad wrought	10.00 to 10.50
Bundled sheets (for steel works)	6.50
Hydraulic compressed, new	7.50 to 8.50
Hydraulic compressed, old	6.50 to 7.00
Machine shop turnings (for steel works)	5.00 to 6.00
Heavy axle turnings (or equiv.)	8.00 to 8.50
Cast borings (for steel works and roll. mill)	5.00 to 6.00
Heavy breakable cast (for steel works)	10.50
Railroad grate bars	8.00
Stove plate (for steel works)	8.00
No. 1 low phos., hvy. (0.04% and under)	12.00 to 13.00
Couplers and knuckles	11.00 to 11.50
Rolled steel wheels	10.00 to 11.00
No. 1 blast f'nace (nom.)	4.50
Wrot. iron and soft steel pipes and tubes (new specific.)	11.00 to 11.50
Shafting	16.50 to 17.00
Steel axles	16.00 to 16.50
No. 1 forge fire	8.00 to 8.50
Cast iron carwheels	12.00 to 12.50
No. 1 cast	11.00 to 11.50
Cast borings (for chem. plant)	12.00 to 12.50
Steel rails for rolling	10.50 to 11.00

BOSTON

Prices on Some Grades of Scrap Go Below $1 a Ton

BOSTON, June 16.—Business in pig iron is still limited, sales the past week not exceeding 700 tons, of which the Mystic Iron Works booked more than half. One lot of 150 tons was the largest individual order. Prospects for new business are uncertain, as the New England melt is decreasing rather than increasing. In numerous instances melters have asked that delivery of second quarter contract iron be deferred until the fourth quarter.

Foundry iron prices per gross ton deliv'd to most New England points:

*Buffalo, sil. 1.75 to 2.25	$19.91 to $20.91
*Buffalo, sil. 2.25 to 2.75	19.91 to 20.91
†Buffalo, sil. 1.75 to 2.25	19.28 to 20.28
†Buffalo, sil. 2.25 to 2.75	19.28 to 20.28
*Ala., sil. 1.75 to 2.25	20.11 to 20.61
*Ala., sil. 2.25 to 2.75	20.61 to 21.11
†Ala., sil. 1.75 to 2.25	16.75
†Ala., sil. 2.25 to 2.75	17.25

Freight rates: $4.91 all rail from Buffalo; $9.61 all rail from Alabama and $5.75 rail and water from Alabama to New England seaboard.

*All rail rate.

†Rail and water rate.

REINFORCING STEEL

The only award of size the past week was 350 tons for a Massachusetts Institute of Technology unit at Cambridge, Mass. Business otherwise approximated 150 tons, all in small lots. Local prices from stock remain as follows: One to 5-ton lots, 3c. a lb., base; 6 to 99-ton lots, 2.40c.; 100-ton lots and larger, 2.30c. On round tonnages, however, prices have been cut $1 a ton or more.

FABRICATED STEEL

Prospective business is slightly larger. A memorial at Worcester, Mass., will require 1500 to 2000 tons of fabricated steel, a Providence, R. I., courthouse addition at least 500 tons, and there are several 100 to 200-ton lots in the market. Indications are the American Bridge Co. will fabricate 980 tons for a Maine bridge, though the contract has not been signed.

OLD MATERIAL

Various kinds of scrap are now selling at less than $1 per ton for the first time within the memory of the trade. For steel turnings, 80c. a ton, on cars shipping point, appears to be the current top price, and that is also the price on mixed borings and turnings. Steel mill borings probably would bring no more, although one broker quotes as high as $1 a ton for them. Scattered carload lots of these materials, and of breakable cast at $5 a ton, on cars shipping point, for Pennsylvania delivery, and of No. 1 heavy melting steel at $4.85 a ton, and of long bundled skeleton for $1 less, for Worcester, Mass., delivery, and textile and No. 1 machinery cast at $9.50 to $10 a ton, delivered, constituted the past week's activities. Quotations on all other kinds of material are nominal.

Buying prices per gross ton, f.o.b. Boston rate shipping points:

No. 1 heavy melting steel		$4.85
Scrap T rails		4.85
Scrap girder rails	4.00 to	4.25
No. 1 railroad wrought	7.00 to	7.50
Machine shop turnings	0.60 to	0.80
Cast iron borings (steel works and rolling mill)	0.60 to	1.00
Bundled skeleton, long		3.85
Forge flashings	5.00 to	5.25
Blast furnace borings and turnings		1.00
Forge scrap	0.50 to	0.80
Shafting	10.00 to	10.50
Steel car axles	11.00 to	12.00
Wrought pipe, 1 in. in diameter (over 2 ft. long)	5.00 to	5.25
Rails for rolling	7.50 to	8.00
Cast iron borings, chemical	7.10 to	8.50
No. 2 cast	5.00 to	5.25

Prices per gross ton deliv'd consumers' yards:

Textile cast	$9.50 to	$10.00
No. 1 machinery cast	9.50 to	10.00
Stove plate	5.00 to	5.25
Railroad malleable	13.00 to	13.50

Warehouse Prices, f.o.b. Boston

	Base per Lb.
Plates	3.36½c.
Structural shapes—	
Angles and beams	3.36½c.
Tees	3.36½c.
Zees	3.36½c.
Soft steel bars, small shapes	3.26½c.
Reinforcing bars	3.11½c. to 3.26½c.
Iron bars—	
Refined	3.26½c.
Best refined	4.60c.
Norway rounds	6.60c.
Norway squares and flats	7.10c.
Spring steel—	
Open-hearth	5.00c. to 10.00c.
Crucible	12.00c.
Tire steel	4.50c. to 5.75c.
Bands	4.015c. to 5.00c.
Hoop steel	5.50c. to 6.00c.
Cold-rolled steel—	
Rounds and hex	3.50c. to 5.50c.
Squares and flats	4.00c. to 6.00c.
Toe calk steel	6.00c.
Rivets, structural or boiler	4.80c.

	Per Cent Off List
Machine bolts	60 and 5
Carriage bolts	60 and 5
Lag screws	60 and 5
Hot-pressed nuts	60 and 5
Cold-punched nuts	60 and 5
Stove bolts	70 and 10

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BUFFALO

Activity in Pig Iron and Scrap at Minimum —Steel Operations Unchanged

BUFFALO, June 16.—The pig iron market is very quiet. Bookings in this district the past week probably were less than 3000 tons. Only three blast furnaces in the district are now active.

Prices per gross ton, f.o.b. furnace:

No. 2 fdy., sil. 1.75 to 2.25	$17.00
No. 2X fdy., sil. 2.25 to 2.75	17.50
No. 1 fdy., sil. 2.75 to 3.25	18.50
Malleable, sil. up to 2.25	17.50
Basic	17.00
Lake Superior charcoal	25.28

FINISHED STEEL

The Lackawanna plant of the Bethlehem Steel Co. continues to operate eight open-hearths; Republic Steel Corpn. is still using four, and Wickwire Spencer is operating three.

Rail steel has been specified for the new warehouse of the Loblaw Grocetarias, involving 500 tons. Lettings of structural steel and reinforcing bars are limited to very small lots.

OLD MATERIAL

The week has been marked by almost an entire absence of activity, though dealers are beginning to feel that the bottom has been reached. There has been no major transaction since the purchase of borings and turnings noted last week. The leading consumer continues to offer $9.50 for No. 1 heavy melting steel and $8 for No. 2 heavy melting steel, but is obtaining very little scrap at these prices.

Prices per gross ton, f.o.b. Buffalo consumers' plants:

Basic Open-Hearth Grades:		
No. 1 heavy melting steel		$9.50
No. 2 heavy melting scrap		8.00
Scrap rails	10.00 to	10.50
Hydraul. comp. sheets	8.50 to	9.00
No. 2 hydraul. comp. sheets		8.00
Hand bundled sheets		7.00
Drop forge flashings		8.00
No. 1 busheling		8.00
Hvy. steel axle turnings	8.50 to	9.50
Machine shop turnings	4.50 to	5.00
No. 1 railroad wrought	7.50 to	8.00
Acid Open-Hearth Grades:		
Knuckles and couplers	12.00 to	12.50
Coil and leaf springs	12.00 to	12.50
Rolled steel wheels	12.00 to	12.50
Low phos. billet and bloom ends	13.00 to	14.00
Electric Furnace Grades:		
Short shov. steel turnings	6.00 to	6.50
Blast Furnace Grades:		
Short mixed borings and turnings	6.00 to	6.50
Cast iron borings	6.00 to	6.50
No. 2 busheling	4.50 to	5.00
Rolling Mill Grades:		
Steel car axles	15.00 to	15.50
Iron axles	16.00 to	16.50
Cupola Grades:		
No. 1 machinery cast	10.00 to	10.50
Stove plate	8.00 to	8.25
Locomotive grate bars	7.00 to	7.50
Steel rails, 3 ft. and under	13.00 to	13.50
Cast iron carwheels	11.50 to	12.00
Malleable Grades:		
Industrial	10.00 to	10.50
Railroad	10.00 to	10.50
Agricultural	10.00 to	10.50
Special Grades:		
Chemical borings	9.00 to	9.50

Warehouse Prices, f.o.b. Buffalo

	Base per Lb.
Plates and struc. shapes	3.25c.
Soft steel bars	3.00c.
Reinforcing bars	2.65c.
Cold-fin. flats and sq.	3.65c.
Rounds and hex	3.15c.
Cold-rolled strip steel	5.25c.
Black sheets (No. 24)	3.70c.
Galv. sheets (No. 24)	4.10c.
Bands	3.35c.
Hoops	3.90c.
Blue ann'l'd sheets (No. 10)	3.50c.
Com. wire nails, base per keg	$2.60
Black wire, base per 100 lb.	3.20

ST. LOUIS

Steel Orders Show Some Improvement—Scrap Market Still Dull and Weak

ST. LOUIS, June 16.—Although buying of pig iron continues at low ebb, prices are unchanged. The business that is being placed consists of carload lots, and buyers show little concern as to prices. Makers believe that it would be folly to reduce prices, being of the opinion that reductions would not stimulate additional buying. While prices are firm, there is not sufficient business available to give the market a real test. Melt of the steel mills is about the same as during the preceding week, with prospects of a slight pick-up. Business is very quiet with the jobbing foundries.

Prices per gross ton at St. Louis:

No. 2 fdy., sil. 1.75 to 2.25, f.o.b. Granite City, Ill.	$17.50
Malleable, f.o.b. Granite City	17.50
N'th'n No. 2 fdy., deliv'd St. Louis	19.66
Southern No. 2 fdy., deliv'd	15.42
Northern malleable, deliv'd	19.66
Northern basic, deliv'd	19.66

Freight rates: 75c. (average) Granite City to St. Louis; $2.16 from Chicago; $4.42 from Birmingham.

FINISHED STEEL

Incoming business of the Granite City Steel Co. has shown a decided improvement during the last two weeks. Bookings for the first 10 days of June were considerably in excess of those for the same period in May. This also holds true with respect to shipments, although the increase is smaller. The demand from the East Texas oil fields have been gratifying, and the call for tin plate continues at a good pace. Incoming tonnage represents comparatively small lots from steel consumers in diversified industries.

OLD MATERIAL

The largest user of busheling and borings in St. Louis district came into the market during the week, buying a month's supply, and announced that it would buy monthly henceforth instead of quarterly, as in the past. The steel mills are out of the market for the present. Prices are unchanged except for wrought iron bars and transoms and railroad malleable, which are 25c. a ton lower, and No. 1 railroad wrought, which is 50c. off.

Railroad lists: Chesapeake & Ohio, 11,176 tons; Louisville & Nashville, 8275 tons; Missouri-Kansas-Texas, 4000 tons; Wabash, 2255 tons; Chicago & Alton, 610 tons; Chicago, Milwaukee, St. Paul & Pacific, 470 tons; Missouri Pacific, 30 carloads; St. Louis San Francisco, 16 carloads.

Dealers' buying prices per gross ton, f.o.b. St. Louis district:

Selected heavy melting steel	$8.25 to	$8.75
No. 1 heavy melting or shoveling steel	8.00 to	8.50
No. 2 heavy melting or shoveling steel	7.25 to	7.75
No. 1 locomotive tires	10.00 to	10.50
Misc. stand.-sec. rails including frogs, switches and guards, cut apart	9.00 to	9.50
Railroad springs	10.00 to	10.50
Bundled sheets	6.00 to	6.50
No. 2 railroad wrought	8.00 to	8.50
No. 1 busheling	6.00 to	6.50
Cast iron borings and shoveling turnings	5.50 to	6.00
Iron rails	8.00 to	8.50
Rails for rolling	10.00 to	10.50
Machine shop turnings	2.75 to	3.25
Heavy turnings	6.00 to	6.50
Steel car axles	12.50 to	13.00
Iron car axles	17.50 to	18.00
Wrot. iron bars and trans.	8.75 to	9.25
No. 1 railroad wrought	5.50 to	6.00
Steel rails, less than 3 ft.	11.00 to	11.50
Steel angle bars	8.50 to	9.00
Cast iron carwheels	7.00 to	7.50
No. 1 machinery cast	8.00 to	8.50
Railroad malleable	8.00 to	8.50
No. 1 railroad cast	8.00 to	8.50
Stove plate	7.00 to	7.50
Relay. rails, 60 lb. and under	16.00 to	16.50
Relay. rails, 70 lb. and over	20.00 to	21.00
Agricult. malleable	7.50 to	8.00

Warehouse Prices, f.o.b. St. Louis

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
Cold-fin. rounds, shafting, screw stock	3.60c.
Black sheets (No. 24)	4.05c.
Galv. sheets (No. 24)	4.60c.
Blue ann'l'd sheets (No. 10)	3.45c.
Black corrug. sheets (No. 24)	4.10c.
Galv. corrug. sheets	4.65c.
Structural rivets	4.15c.
Boiler rivets	4.15c.

	Per Cent Off List
Tank rivets, ⅞-in. and smaller, 100 lb. or more	65
Less than 100 lb	60
Machine bolts	60 and 10
Carriage bolts	60 and 10
Lag screws	60 and 10
Hot-pressed nuts, sq., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb	50 and 10
Hot-pressed nuts, hex., blank or tapped, 200 lb. or more	60 and 10
Less than 200 lb	50 and 10

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CINCINNATI

Pig Iron Demand Sustained, Though Buying Is for Short Period Only

CINCINNATI, June 16.—Despite the advent of summer weather, demand for pig iron during the past week was sustained at the level of preceding weeks. Users of pig iron are not anticipating their needs for more than a short period and, accordingly, the trade feels that the present demand probably will continue through the warm months. Bookings last week were approximately 1700 tons, of which about 300 tons went to Southern furnaces. Prices on Southern iron have been well maintained in this district. Northern iron, on the other hand, appears to be uncertain in price.

Prices per gross ton, deliv'd Cincinnati:

Ala. fdy., sil. 1.75 to 2.25	$14.69
Ala. fdy., sil. 2.25 to 2.75	15.19
Tenn. fdy., sil. 1.75 to 2.25	14.69
S'th'n Ohio silvery, 8 per cent	23.89

Freight rates, $1.89 from Ironton and Jackson, Ohio; $3.69 from Birmingham.

FINISHED MATERIAL

The demand for sheets in this district during the last week was at about the same rate as in the preceding week. The character of the demand has shown relatively no change.

OLD MATERIAL

With only one or two mills in the district accepting scrap shipments, the local market is quiet and featureless. While dealers are adhering as closely as possible to the quotations printed below, the feeling is general that they are merely nominal, since there have been no sizable transactions to test them.

Dealers' buying prices per gross ton, f.o.b. cars, Cincinnati:

Heavy melting steel	$8.25 to	$8.75
Scrap rails for melting	10.25 to	10.75
Loose sheet clippings	4.50 to	5.00
Bundled sheets	7.75 to	8.25
Cast iron borings	4.75 to	5.25
Machine shop turnings	5.00 to	5.50
No. 1 busheling	6.75 to	7.25
No. 2 busheling	4.25 to	4.75
Rails for rolling	11.50 to	12.00
No. 1 locomotive tires	9.50 to	10.00
No. 2 railroad wrought	8.25 to	8.75
Short rails	13.00 to	13.50
Cast iron carwheels	10.50 to	11.00
No. 1 machinery cast	12.50 to	13.00
No. 1 railroad cast	11.50 to	12.00
Burnt cast	5.25 to	5.75
Stove plate	5.25 to	5.75
Brake shoes	5.25 to	5.75
Agricultural malleable	10.00 to	10.50
Railroad malleable	11.00 to	11.50

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Detroit Scrap Market Is Still Weak

DETROIT, June 16.—Heavy melting steel has declined 25c. a ton in the past week, and other items are showing a weaker tendency. The market is dull, with consumers displaying little interest. Dealers are continuing to build up yard stocks in anticipation of steel plant buying in the summer.

Dealers' buying prices per gross ton, f.o.b. cars, Detroit:

Hvy. melting and shov. steel	$6.75 to	$7.25
Borings and short turnings	3.50 to	4.00
Long turnings	3.00 to	3.50
No. 1 machinery cast	8.25 to	8.75
Automotive cast	11.00 to	11.50
Hydraul. comp. sheets	6.25 to	6.75
Stove plate	6.25 to	6.50
New No. 1 busheling	6.00 to	6.50
Old No. 2 busheling	2.50 to	3.00
Sheet clippings	3.75 to	4.25
Flashings	6.00 to	6.50

Warehouse Prices, f.o.b. Cincinnati

	Base per Lb.
Plates and struc. shapes	3.25c.
Bars, soft steel or iron	3.15c.
New billet reinforc. bars	3.15c.
Rail steel reinforc. bars	3.00c.
Hoops	3.90c.
Bands	3.35c.
Cold-fin. rounds and hex.	3.80c.
Squares	4.30c.
Black sheets (No. 24)	3.90c.
Galv. sheets (No. 24)	4.40c.
Blue ann'l'd sheets (No. 10)	3.45c.
Structural rivets	4.20c.
Small rivets	60 per cent off list
No. 9 ann'l'd wire, per 100 lb.	$3.00
Com. wire nails, base per keg (25 kegs or more)	2.95
Cement c't'd nails, base 100 lb. keg	2.95
Chain, per 100 lb.	10.25

	Net per 100 Ft.
Lap-welded steel boiler tubes, 2-in.	$16.50
4-in.	34.50
Seamless steel boiler tubes, 2-in.	17.50
4-in.	36.00

BIRMINGHAM

Steel Operations Gain Slightly But Blast Furnace Activity Is Lower

BIRMINGHAM, June 16.—The dullness of the pig iron market is without variation. New tonnage is scarce, and shipping instructions on contracts are restricted to the minimum. Melters seem to be operating on a day-to-day basis, taking only as much as is needed for a few days in advance. Quotations continue at $12 to $13 for district business. Active furnaces have been reduced to 12, Gulf States Steel having blown out a stack on June 10. This will be out for the remainder of the summer, according to present plans. Woodward Iron has changed one of its three active stacks from foundry to basic. Operations of other companies are the same.

Prices per gross ton, f.o.b. Birmingham dist. furnaces:

No. 2 fdy., 1.75 to 2.25 sil.	$12.00 to $13.00
No. 1 fdy., 2.25 to 2.75 sil.	12.50 to 13.50
Basic	12.00 to 13.00

CAST IRON PIPE

No improvement is reported in the pipe market, and prospects are not what they were 30 days ago. Current tonnage is mostly an accumulation of scattered small orders. Plant operations are now scarcely 50 per cent. Quotations still are on a $35 to $36 base.

FINISHED STEEL

Present bookings are varying little from week to week. Several projects involving considerable tonnage are pending. Business of the fabricators is in small amounts. Dudley Bar Co. is to furnish 280 tons of bars for barracks at Fort Benning. This company also booked about 200 tons for highway work in Mississippi and Louisiana. Open-hearth operations were improved last week. The Tennessee company increased from five to seven at Ensley and continued with four at Fairfield. Gulf States Steel has two active at Alabama City.

OLD MATERIAL

There is hardly a market at this time. Only a few minor sales were made last week.

Prices per gross ton deliv'd Birmingham dist. consumers' yards:

Heavy melting steel	$9.50 to $10.00
Scrap steel rails	10.00
Short shoveling turnings	7.50
Cast iron borings	(No market)
Stove plate	7.00
Steel axles	15.00 to 16.00
Iron axles	18.00
No. 1 railroad wrought	8.00
Rails for rolling	11.50 to 12.00
No. 1 cast	9.50
Tramcar wheels	10.00 to 10.25
Cast iron borings, chem.	13.50

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PACIFIC COAST

Steel Price Structure Weakens—Sales Mostly in Small Lots

SAN FRANCISCO, June 13.—Movement of steel products on the Pacific Coast this week was restricted, with few exceptions, to lots of less than 100 tons. New inquiries continue to develop slowly, and from present indications there is little likelihood of substantial improvement during the next two months. The price structure is weak, some low quotations having appeared recently in several lines.

BARS

Merchant and reinforcing steel bars are moving slowly. The bulk of the current business comes from public work projects under way. Unnamed interests took 268 tons for a bridge over the Santa Clara River in Ventura County, Cal., and 148 tons for paving in San Joaquin County, Cal. The Northwest Steel Rolling Mills booked 275 tons for a high school in Spokane and 100 tons for paving projects in Washington. Bids have just been opened on 1695 tons for a dam near Cle Elum, Wash., for the United States Bureau of Reclamation. Mild steel bars are weak at 2.10c., c.i.f. Out-of-stock prices in the San Francisco district on reinforcing bars continue to hold at 2.60c., base, on carload lots, while Los Angeles quotations remain unchanged at 2.50c., base.

Pig iron prices per gross ton at San Francisco:

*Utah basic	$22.00 to $24.00
*Utah fdy., sil. 2.75 to 3.25	22.00 to 24.00
**Indian fdy., sil. 2.75 to 3.25	22.00 to 24.00

*Delivered San Francisco.
**Duty paid, f.o.b. cars San Francisco.

PLATES

Only two plate awards of importance were reported this week. The Puget Sound Machinery Depot secured 200 tons for tanks for the new Ford plant in Seattle. The Philadelphia Quartz Co., South Gate, Cal., placed 250 tons for bins with the Consolidated Steel Corpn., and 50 tons for tanks with the Western Pipe & Steel Co. Prices are weak at 2c., c.i.f.

Warehouse Prices, f.o.b. San Francisco

	Base per Lb.
Plates and struc. shapes	2.50c.
Soft steel bars	2.50c.
Black sheets (No. 24)	4.15c.
Blue ann'l'd sheets (No. 10)	3.05c.
Galv. sheets (No. 24)	4.65c.
Struc. rivets, ½-in. and larger	5.00c.
Com. wire nails, base per keg	$3.35
Cement c't'd nails, 100 lb. keg	3.35

SHAPES

Demand for structural steel shapes is not active. Fabricating plants have few jobs up for figures. It is reported that the Wallace Bridge & Structural Steel Co. booked 600 tons for a bascule bridge for Seattle. Unnamed interest secured 233 tons for two bridges in Apache County, Ariz., and 220 tons for the Hell Gate bridge over the Willamette River in Lane County, Ore. The only new inquiry of importance involves 175 tons for a grandstand for the Los Angeles County fair grounds, on which the Consolidated Steel Corpn. is low bidder. Shapes are quoted around 2.05c., c.i.f.

CAST IRON PIPE

Awards of cast iron pipe were in lots of less than 100 tons. Bids have been opened on 483 tons of 2-in. pipe for Los Angeles and on 105 tons of 2-in. pipe for Long Beach, Cal. New inquiries include 208 tons of 2 to 12-in. Class 150 pipe for Fairfield, Cal., bids on which will be opened on June 18. La Conner, Wash., will open bids June 18 on 241 tons of 4 and 6-in. Class B pipe. Burbank, Cal., will open bids June 16 on 233 tons of 6 to 18-in. Class B or centrifugal pipe.

SHEETS

Sales and inquiries usually call for less than carload lots. Culvert manufacturers are fairly busy on highway work, but the general trade is operating on a limited scale. Blue annealed, No. 10 gage, holds at 2.50c., c.i.f. Black and galvanized sheets, No. 24 gage, are quoted at 3c. and 3.50c., c.i.f., respectively.

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Canada

Pig Iron and Scrap Markets Very Dull

TORONTO, June 16.—Demand for merchant pig iron in the Canadian markets is dull. Melters are showing interest only in current needs. Local blast furnace representatives do not look for much contract buying for third quarter. Prices are unchanged.

Prices per gross ton:

Delivered Toronto

No. 1 fdy., sil. 2.25 to 2.75	$22.60
No. 2 fdy., sil. 1.75 to 2.25	22.10
Malleable	22.60

Delivered Montreal

No. 1 fdy., sil. 2.25 to 2.75	$24.00
No. 2 fdy., sil. 1.75 to 2.25	23.50
Malleable	24.00
Basic	20.50

OLD MATERIAL

Consumers are showing little or no interest and are placing orders only when special grades are desired for immediate use. No forward buying is

being done either in steel or iron grades. No change has been made in price lists.

Dealers' buying prices for old material:

Per Gross Ton

	Toronto	Montreal
Heavy melting steel	$7.00	$6.00
Rails, scrap	7.00	6.00
No. 1 wrought	6.00	8.00
Machine shop turnings	2.00	2.00
Boiler plate	5.00	4.50
Heavy axle turnings	2.50	2.50
Cast borings	2.00	2.00
Steel borings	2.00	2.00
Wrought pipe	2.00	2.00
Steel axles	7.00	9.00
Axles, wrought iron	7.00	11.00
No. 1 machinery cast	....	10.00
Stove plate	....	8.00
Standard carwheels	....	8.50
Malleable	....	8.00

Per Net Ton

No. 1 mach'ry cast	11.00	....
Stove plate	9.00	....
Standard carwheels	10.00	....
Malleable scrap	9.00	....

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Factory Earnings Declined in April

Average weekly earnings in representative New York State factories are reported by the State industrial commissioner at $27.35, compared with $27.96 in March. Except for January at $27.01, the latest figure is the lowest since that for July, 1924. It compares with $29.44, or 7½ per cent higher, in April, 1930.

Practically a steady increase was shown in these figures, which include all employees in both office and shop, from the fall of 1914 to the fall of 1920. In those six years the earnings went from $12.26 to $28.93 a week. The business depression of 1921 carried the earnings to a low of $24.15 in April, 1922. After that there was a constant advance, with a few slight interruptions, to a peak of $30.47 a week in September, 1929. Then came the further decline, to the low figure of 1931.

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Russia to Establish Large Scrap Yard

As part of its program to enlarge the steel industry in Russia, the Soviet Government is planning the establishment of a large scrap iron yard. This was revealed in a communication from Amtorg, the commercial representative of the Soviet Government in the United States, to Benjamin Schwartz, director general of the Institute of Scrap Iron and Steel, whose advice on the equipment and organization of such a yard has been sought.

It is stated that the scrap yard in Russia will have a capacity of approximately 400,000 tons of metal yearly, representing a yard larger than any operating in the United States at the present time. This capacity will include approximately 60,000 tons of sheet metal of ⅛-in. thickness, 17,000 tons of steel and cast iron chips, 40,000 tons of castings to be broken up, and various other scrap commodities to be prepared and remelted in the steel furnaces.

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Sheet Sales and Output Fell Sharply in May

Sales of steel sheets by independent mills declined more than 40,000 tons in May, according to the monthly report of the National Association of Flat Rolled Steel Manufacturers. Production, shipments and unfilled orders also fell off considerably. The May report and comparison in net tons follow:

	May	April	March
Sales	148,612	191,987	236,310
Production	201,846	213,608	224,322
Shipments	191,942	211,118	208,207
Unfilled orders	296,731	325,169	383,280
Unshipped orders	86,912	91,431	100,581
Unsold stocks	82,532	85,415	89,334
Capacity per month	527,900	543,400	543,400
Percentage reporting	67.6	67.6	67.6
Percentages, Based on Capacity			
Sales	41.7	52.3	64.3
Production	56.6	58.2	61.1
Shipments	53.8	57.5	56.7
Unfilled orders	83.2	88.5	104.3
Unshipped orders	24.4	24.9	27.4
Unsold stocks	23.1	23.2	24.3

Sheet Prices Under New Classification

New base prices for sheet mill products, under the new classification, are now being quoted by mills on new business and are to take full effect on third quarter contracts.

The term "hot-rolled" annealed replaces such designations heretofore described as "one-pass cold-rolled," "box annealed," "black sheets," "blue annealed."

The term "cold-rolled sheets" takes the place of "single pickled cold-rolled" and "full pickled cold-rolled."

Now base prices are as follows:

	Per Lb., Pittsburgh
Hot-rolled, No. 10 gage	1.70c.
Hot-rolled annealed, No. 24	2.40c.
Heavy cold-rolled, No. 10	2.35c.
Cold-rolled, No. 20	2.95c.
Automobile body sheets, No. 20	3.10c.
Heavy furniture sheets, No. 10	2.75c.
Light furniture sheets, No. 20 (Prices on furniture stock include stretcher leveling but not resquareing)	3.35c.
Galvanized sheets, No. 24	2.90c.
Long ternes, unassorted, No. 24	3.15c.

Usual differential over Pittsburgh base prices of a $2 a ton applies on all of these grades at Chicago district mills.

Corporation's Unfilled Orders Decline

A seasonal decline in unfilled orders of the United States Steel Corpn. leaves the total as of May 31 at 3,620,452 tons. The drop during May was 277,277 tons, almost as much as the 295,000-ton decline a year ago.

During the 10 years, 1921 to 1930, inclusive, the unfilled orders declined in May every year except 1922, when an increase of 157,000 tons was reported. In that period the minimum decrease was 123,000 tons, in 1929, when business was booming, and the maximum decrease was 580,000 tons, in 1924, when business was falling off. The average for the 10 years was 299,000 tons, or slightly more than the decline this year.

At the May 30 level, orders are 439,000 tons lower than a year ago, and 684,000 tons lower than at the end of May, 1929. The figure is the lowest since that for Oct. 30, 1930.

Unfilled tonnage at the end of each month for the past two and a half years follows:

	1931	1930	1929
January	4,132,351	4,468,710	4,109,487
February	3,965,194	4,479,748	4,144,341
March	3,995,330	4,570,653	4,410,718
April	3,897,729	4,354,220	4,427,763
May	3,620,452	4,059,227	4,304,167
June	.....	3,968,064	4,256,910
July	.....	4,022,055	4,088,177
August	.....	3,580,204	3,658,211
September	.....	3,424,338	3,902,581
October	.....	3,481,763	4,086,562
November	.....	3,639,636	4,125,345
December	.....	3,943,596	4,417,193

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Production of Lead Less in 1930

Refined primary lead produced in the United States in 1930 is reported by the Bureau of Mines at 643,033 net tons. This is a reduction of about 20 per cent from the 774,633 tons produced in 1929, and the 781,071 tons in 1928. The shrinkage was much sharper in foreign desilvered lead than in the lead produced from domestic ores. From 1928 to 1930 the foreign lead dropped off more than one-half, whereas the domestic production showed a decline of less than 9 per cent. Compared with 1929, however, the decline in domestic lead was almost 15 per cent.

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Hackensack Water Co., Weehawken, N. J., which recently awarded contract for 38,000 ft. 52-in. steel pipe to T. A. Gillespie Co., New York, will expend a total of about $1,000,000 on this project, which is to include a 50,000,000 gal. concrete reservoir and connecting pipe line in the northern part of Bergen County, N. J. Contracts for the reservoir will soon be let.

Semi-Finished Steel, Raw Materials, Bolts and Rivets

MILL PRICES OF SEMI-FINISHED STEEL

Billets and Blooms

	Per Gross Ton
Rerolling, 4-in. and under 10-in., Pittsburgh	$29.00 to $30.00
Rerolling, 4-in. and under 10-in., Youngstown	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Cleveland	29.00 to 30.00
Rerolling, 4-in. and under 10-in., Chicago	31.00 to 32.00
Forging quality, Pittsburgh	35.00 to 36.00

Sheet Bars
(Open-Hearth or Bessemer)

	Per Gross Ton
Pittsburgh	$29.00 to $30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

Slabs
(8 in. x 2 in. and under 10 in. x 10 in.)

	Per Gross Ton
Pittsburgh	$29.00 to $30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00

Skelp
(F.o.b. Pittsburgh or Youngstown)

	Per Lb.
Grooved	1.65c.
Universal	1.65c.
Sheared	1.65c.

Wire Rods
(Common soft, base)

	Per Gross Ton
Pittsburgh	$35.00
Cleveland	35.00
Chicago	35.00

PRICES OF RAW MATERIAL

Ores

Lake Superior Ores, Delivered Lower Lake Ports

	Per Gross Ton
Old range Bessemer, 51.50% iron	$4.80
Old range non-Bessemer, 51.50% iron	4.65
Mesabi Bessemer, 51.50% iron	4.65
Mesabi non-Bessemer, 51.50% iron	4.50
High phosphorus, 51.50% iron	4.40

Foreign Ore, c.i.f. Philadelphia or Baltimore

	Per Unit
Iron ore, low phos., copper free, 55 to 58% iron in dry Spanish or Algeria	8c. to 9c.
Iron ore, low phos., Swedish, average 68% iron	10.00c.
Iron ore, basic or foundry, Swedish, average 65% iron	9.00c.
Manganese ore, washed 52% manganese, from the Caucasus	25c. to 27c.
Manganese ore, African or Indian, 50 to 52%	24c. to 26c.
Manganese ore, Brazilian, 46 to 48%	22c. to 24c.
Tungsten ore, high grade, per unit, in 60% concentrates	$12.00 to $12.50

	Per Gross Ton
Chrome ore, 45% Cr_2O_3 crude, c.i.f. Atlantic seaboard	$20.00
Chrome ore, 48% Cr_2O_3 crude, c.i.f. Atlantic seaboard	22.50

Coke

	Per Net Ton
Furnace, f.o.b. Connellsville prompt	$2.40
Foundry, f.o.b. Connellsville prompt	$3.25 to 4.75
Foundry, by-product, Ch'go ovens	7.50
Foundry, by-product, New England, del'd	10.50
Foundry, by-product, Newark or Jersey City, delivered	8.70 to 9.10
Foundry, by-product, Phila.	9.00
Foundry, Birmingham	5.00
Foundry, by-product, St. Louis, f.o.b. ovens	8.00
Foundry, by-product, del'd St. Louis	9.00

Coal

	Per Net Ton
Mine run steam coal, f.o.b. W. Pa. mines	$1.40 to $1.50
Mine run coking coal, f.o.b. W. Pa.	1.40 to 1.50
Gas coal, ¾-in., f.o.b. Pa. mines	1.70 to 1.80
Mine run gas coal, f.o.b. Pa. mines	1.50 to 1.60
Steam slack, f.o.b. W. Pa. mines	85c. to 90c.
Gas slack, f.o.b. W. Pa. mines	1.00 to 1.10

Ferromanganese

	Per Gross Ton
Domestic, 80%, seaboard	*$80.00 to $85.00
Foreign, 80%, Atlantic or Gulf port, duty paid	*80.00 to 85.00

*Minimum price quoted for lots of 2000 tons or more.

Spiegeleisen

	Per Gross Ton Furnace
Domestic, 19 to 21%	$28.00 to $30.00

Electric Ferrosilicon

	Per Gross Ton Delivered
50%	$83.50
75%	130.00

Per Gross Ton Furnace		*Per Gross Ton Furnace*	
10%	$35.00	12%	$39.00
11%	37.00	14 to 16%	31.00

Bessemer Ferrosilicon

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
10%	$25.00	13%	$29.00
11%	26.00	14%	31.00
12%	27.00	15%	33.00

Silvery Iron

F.o.b. Jackson County, Ohio, Furnace

Per Gross Ton		*Per Gross Ton*	
6%	$19.00 to $21.00	11%	$22.00 to $24.00
7%	19.50 to 21.50	12%	23.00 to 25.00
8%	20.00 to 22.00	13%	25.00 to 27.00
9%	20.50 to 22.50	14%	27.00 to 29.00
10%	21.00 to 23.00	15%	29.00 to 31.00

Delivered prices at Chicago are about 50c. a ton below this schedule.

Other Ferroalloys

Ferrotungsten, per lb. contained metal del'd, carloads	$1.08
Ferrotungsten, less carloads	$1.15 to 1.25
Ferrochromium, 4 to 6% carbon and up, 65 to 70% Cr., per lb. contained Cr. delivered, in carloads	11.00c.
Ferrochromium, 2% carbon	17.00c. to 17.50c.
Ferrochromium, 1% carbon	19.00c. to 20.00c.
Ferrochromium, 0.10% carbon	24.50c. to 26.00c.
Ferrochromium, 0.06% carbon	26.50c. to 28.00c.
Ferrovanadium, per lb. contained vanadium, f.o.b. furnace	$3.15 to $3.65
Ferrocarbontitanium, 15 to 18%, per net ton, f.o.b. furnace, in carloads	$160.00
Ferrophosphorus, electric or blast furnace material, in carloads, 18%, Rockdale, Tenn., base per gross ton	91.00
Ferrophosphorus, electric, 24%, f.o.b. Anniston, Ala., per gross ton	122.50
Silico spiegel, per ton, f.o.b. furnace, car lots	42.50
Ton lots or less, per ton	47.50
Silico-manganese, gross ton, delivered:	
2.50% carbon grade	$105.00
1% carbon grade	115.00
Spot prices	$5 a ton higher

Fluxes and Refractories

Fluorspar

	Per Net Ton
Domestic, 85% and over calcium fluoride, not over 5% silicon, gravel, f.o.b. Illinois and Kentucky mines	$14.00
No. 2 lump, Illinois and Kentucky mines	17.00
Foreign, 85% calcium fluoride, not over 5% silicon, c.i.f. Atlantic port, duty paid	17.00
Domestic, No. 1 ground bulk, 95 to 98% calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines	32.50

Fire Clay Brick

	Per 1000 f.o.b. Works	
	High-Heat Duty Brick	Intermediate Heavy Duty Brick
Pennsylvania	$40.00 to $43.00	$32.00 to $35.00
Maryland	40.00 to 43.00	32.00 to 35.00
New Jersey	40.00 to 43.00	.....
Ohio	40.00 to 43.00	32.00 to 35.00
Kentucky	40.00 to 43.00	32.00 to 35.00
Missouri	40.00 to 43.00	32.00 to 35.00
Illinois	40.00 to 43.00	32.00 to 35.00
Ground fire clay, per ton	6.50	

Silica Brick

	Per 1000 f.o.b. Works
Pennsylvania	$45.00
Chicago	49.00
Birmingham	47.00
Silica clay, per ton	8.00

Magnesite Brick

	Per Net Ton
Standard sizes, f.o.b. Baltimore and Chester, Pa.	$65.00
Grain magnesite, f.o.b. Baltimore and Chester, Pa.	40.00

Chrome Brick

	Per Net Ton
Standard size	$45.00

MILL PRICES OF BOLTS, NUTS, RIVETS AND SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

	Per Cent Off List
†Machine bolts	73
†Carriage bolts	73
Lag bolts	73
Plow bolts, Nos. 1, 2, 3 and 7 heads	73
Hot-pressed nuts, blank or tapped, square	73
Hot-pressed nuts, blank or tapped, hexagons	73
C.p.c. and t. square or hex. nuts, blank or tapped	73
Washers*	7.00c. to 6.75c. per lb. off list

*F.o.b. Chicago, New York and Pittsburgh.

†Bolts with rolled thread up to and including ⅝ in. x 6 in. take 10 per cent lower list prices.

Bolts and Nuts

	Per Cent Off List
Semi-finished hexagons nuts	73
Semi-finished hexagons castellated nuts, S.A.E.	73
Stove bolts in packages, P'gh	80, 10, 10 and 5
Stove bolts in packages, Chicago	80, 10, 10 and 5
Stove bolts in packages, Cleveland	80, 10, 10 and 5
Stove bolts in bulk, P'gh	80, 10, 10, 5 and 2½
Stove bolts in bulk, Chicago	80, 10, 10, 5 and 2½
Stove bolts in bulk, Cleveland	80, 10, 10, 5 and 2½
Tire bolts	60, 10 and 10

Discounts of 73 per cent off on bolts and nuts apply on carload business with jobbers and large consumers.

Large Rivets
(½-in. and larger)

	Base per 100 Lb.
F.o.b. Pittsburgh or Cleveland	$2.75
F.o.b. Chicago	2.85

Small Rivets
(⅞-in. and smaller)

	Per Cent Off List
F.o.b. Pittsburgh	70, 10 and 5
F.o.b. Cleveland	70, 10 and 5
F.o.b. Chicago	70, 10 and 5

Cap and Set Screws

(Freight allowed up to but not exceeding 50c. per 100 lb. on lots of 200 lb. or more)

	Per Cent Off List
Milled cap screws	80, 10, 10 and 5
Milled standard set screws, case hardened,	80 and 5
Milled headless set screws, cut thread	75 and 10
Upset hex. head cap screws, U.S.S.S. thread,	85 and 10
Upset hex. cap screws, S.A.E. thread	85 and 10
Upset set screws	80, 10 and 5
Milled studs	70

Mill Prices of Finished Iron and Steel Products

Iron and Steel Bars

Soft Steel

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
Del'd Philadelphia	1.94c. to 1.99c.
Del'd New York	1.98c. to 2.03c.
F.o.b. Cleveland	1.65c. to 1.70c.
F.o.b. Lackawanna	1.75c. to 1.80c.
F.o.b. Birmingham	1.80c.
C.i.f. Pacific ports	2.10c.
F.o.b. San Francisco mills	2.10c.

Billet Steel Reinforcing

F.o.b. P'gh mills, 40, 50, 60-ft.	1.60c. to 1.65c.
F.o.b. Birmingham, mill lengths	1.75c.

Rail Steel

F.o.b. mills, east of Chicago dist.	1.30c. to 1.35c.
F.o.b. Chicago Heights mill	1.60c. to 1.65c.
Del'd Philadelphia	1.84c. to 1.89c.

Iron

Common iron, f.o.b. Chicago	1.70c. to 1.80c.
Refined iron, f.o.b. P'gh mills	2.75c.
Common iron, del'd Philadelphia	2.09c.
Common iron, del'd New York	2.14c.

Tank Plates

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.80c.
Del'd Cleveland	1.83½c.
Del'd Philadelphia	1.85½c.
F.o.b. Coatesville	1.75c.
F.o.b. Sparrows Point	1.75c.
F.o.b. Lackawanna	1.75c.
Del'd New York	1.93c.
C.i.f. Pacific ports	2.00c.

Structural Shapes

	Base per Lb.
F.o.b. Pittsburgh mill	1.65c.
F.o.b. Chicago	1.70c. to 1.80c.
F.o.b. Birmingham	1.80c.
F.o.b. Lackawanna	1.75c.
F.o.b. Bethlehem	1.75c.
Del'd Cleveland	1.83½c.
Del'd Philadelphia	1.76c. to 1.81c.
Del'd New York	1.90½c.
C.i.f. Pacific ports	2.05c.

Hot-Rolled Hoops, Bands and Strips

	Base per Lb.
6 in. and narrower, P'gh	1.60c. to 1.65c.
Wider than 6 in., P'gh	1.50c. to 1.55c.
6 in. and narrower, Chicago	1.65c. to 1.75c.
Wider than 6 in., Chicago	1.55c. to 1.65c.
Cooperage stock, P'gh	1.80c. to 1.90c.
Cooperage stock, Chicago	1.80c. to 1.90c.

Cold-Finished Steel

	Base per Lb.
Bars, f.o.b. Pittsburgh mill	2.10c.
Bars, f.o.b. Chicago	2.10c.
Bars, Cleveland	2.10c.
Bars, Buffalo	2.10c.
Shafting, ground, f.o.b. mill	*2.45c. to 3.40c.
Strips, P'gh	2.15c.
Strips, Cleveland	2.15c.
Strips, deliv'd Chicago	2.43c.
Strips, Worcester	2.30c.
Fender stock, No. 20 gage, Pittsburgh or Cleveland	3.20c.

*According to size.

Wire Products

(Carload lots, f.o.b. Pittsburgh and Cleveland)

To Manufacturing Trade

Bright wire	2.20c.
Spring wire	3.20c.

To Jobbing Trade

	Base per Lb.
Smooth annealed wire	2.25c. to 2.35c.
Smooth galvanized wire	2.70c. to 2.80c.
Polished staples	2.25c. to 2.35c.
Galvanized staples	2.50c. to 2.60c.
Barbed wire, galvanized	2.45c. to 2.55c.
Woven wire fence, per net ton	$60.00

	Base per Keg
Standard wire nails	$1.80
Smooth coated nails	1.80
Galvanized nails	3.80

To Retail Trade

	Base per Lb.
Bright wire	2.30c.
Smooth annealed wire	2.40c.
Smooth galvanized wire	2.90c.

	Base per Keg
Standard wire nails	$1.90
Cement coated nails	1.90
Galvanized nails	3.90

	Base per Lb.
Polished staples	2.45c.
Galvanized staples	2.70c.
Barbed wire, galvanized	2.65c.
Woven wire fence, per net ton	$65.00

Anderson, Ind., mill prices are ordinarily $1 a ton over Pittsburgh base; Duluth, Minn., and Worcester, Mass., mill $2 a ton over Pittsburgh, and Birmingham mill $3 a ton over Pittsburgh.

(Sheet prices under the old classification, as shown below, are applicable only on orders or specifications placed this month. On all new business for delivery after July 1 the new prices, printed on the second page preceding, will apply.)

Light Plates

	Base per Lb.
No. 10, blue annealed, f.o.b. P'gh	1.85c.
No. 10, blue annealed, f.o.b. Chicago dist.	1.95c.
No. 10, blue an'l'd, del'd Phila.	2.14c. to 2.19c.
No. 10, blue annealed, B'ham	2.00c. to 2.05c.
No. 10, blue annealed, Pacific Coast ports	2.50c.

Sheets

Blue Annealed

	Base per Lb.
No. 13, f.o.b. P'gh	2.00c.
No. 13, f.o.b. Chicago dist.	2.10c.
No. 13, del'd Philadelphia	2.29c.
No. 13, blue annealed, B'ham	2.15c.

Box Annealed, One Pass Cold Rolled

No. 24, f.o.b. Pittsburgh	2.15c. to 2.25c.
No. 24, f.o.b. Chicago dist. mill	2.35c.
No. 24, del'd Philadelphia	2.44c. to 2.54c.
No. 24, f.o.b. Birmingham	2.40c.
No. 24, c.i.f. Pacific Coast ports	3.00c.

Steel Furniture Sheets

No. 24, f.o.b. P'gh	3.40c.

Galvanized

No. 24, f.o.b. Pittsburgh	2.75c. to 2.80c.
No. 24, f.o.b. Chicago dist. mill	2.85c. to 2.90c.
No. 24, del'd Cleveland	2.93½c. to 2.98½c.
No. 24, del'd Philadelphia	3.04c. to 3.09c.
No. 24, f.o.b. Birmingham	2.85c. to 2.90c.
No. 24, c.i.f. Pacific Coast ports	3.50c.

Continuous Mill Sheets

No. 10 gage	1.70c.
No. 13 gage	1.85c.

Tin Mill Black Plate

No. 28, f.o.b. Pittsburgh	2.55c. to 2.65c.
No. 28, f.o.b. Chicago dist. mill	2.65c. to 2.75c.

Automobile Body Sheets

No. 20, f.o.b. Pittsburgh	3.00c. to 3.10c.

Long Ternes

No. 24, 8-lb. coating, f.o.b. mill:	
Unassorted	3.10c.
Assorted	3.20c.
Primes only	3.30c.

Vitreous Enameling Stock

No. 10, Pittsburgh	2.90c. to 3.10c.
No. 20, Pittsburgh	3.40c. to 3.60c.

Tin Plate

	Base per Box
Standard cokes, f.o.b. P'gh district mills	$5.00
Standard cokes, f.o.b. Gary	5.10

Terne Plate

(F.o.b. Morgantown or Pittsburgh)

(Per Package, 20 x 28 in.)

8-lb. coating I.C.	$10.30
15-lb. coating I.C.	12.90
20-lb. coating I.C.	14.00
25-lb. coating I.C.	$15.20
30-lb. coating I.C.	16.00
40-lb. coating I.C.	17.80

Alloy Steel Bars

(F.o.b. maker's mill)

Alloy Quantity Bar Base, 2.65c. per Lb.

S.A.E. Series Numbers		Alloy Differential
2000	(1¼% Nickel)	$0.25
2100	(1¼% Nickel)	0.55
2300	(3½% Nickel)	1.50
2500	(5% Nickel)	2.25
3100	Nickel Chromium	0.55
3200	Nickel Chromium	1.35
3300	Nickel Chromium	3.80
3400	Nickel Chromium	3.20
4100	Chromium Molybdenum (0.15 to 0.25 Molybdenum)	0.50
4100	Chromium Molybdenum (0.25 to 0.40 Molybdenum)	0.70
4600	Nickel Molybdenum (0.20 to 0.30 Molybdenum, 1.25 to 1.75 Nickel)	1.05
5100	Chromium Steel (0.60 to 0.90 Chromium)	0.35
5100	Chromium Steel (0.80 to 1.10 Chromium)	0.45
5100	Chromium Spring Steel	0.20
6100	Chromium Vanadium Bar	1.20
6100	Chromium Vanadium Spring Steel	0.95
9250	Silicon Manganese Spring Steel (flats)	0.25
	Rounds and squares	0.50
	Chromium Nickel Vanadium	1.50
	Carbon Vanadium	0.95

Above prices are for hot-rolled steel bars, forging quality. The differential for cold-drawn bars is ¾c. a lb. higher, with standard classification for cold-finished alloy steel bars applying. For billets 4 x 4 to 10 x 10 in., the price for a gross ton is the net price for bars of the same analysis.

Billets under 4 x 4 in. carry the steel bar base. Slabs with a sectional area of 16 in. or over carry the billet price. Slabs with sectional area of less than 16 in. or less than 2½ in. thick, regardless of sectional area, take the bar price.

Rails

	Per Gross Ton
Standard, f.o.b. mill	$43.00
Light (from billets), f.o.b. mill	34.00
Light (from rail steel), f.o.b. mill	32.00

Track Equipment

	Base per 100 Lb.
Spikes, ⅝ in. and larger	$2.70
Spikes, ½ in. and larger	2.70
Spikes, boat and barge	$2.90
Tie plate, steel	1.95
Angle bars	2.75
Track bolts, to steam railroads	$3.80 to 4.00
Track bolts, to jobbers, all sizes, per 100 count	73 per cent off list

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District and Lorain, Ohio, Mills

Butt Weld

Steel Inches	Black	Galv.	Iron Inches	Black	Galv.
⅛	47	21½	¼ and ⅜	+11	+36
¼ to ⅜	53	27½	½	23	5
½	58	44½	¾	28	11
¾	62	50½	1 and 1¼	31	15
1 to 3	64	52½	1½ and 2	35	18

Lap Weld

2	57	45½	2	23	9
2½ to 6	61	49½	2½ to 3½	28	13
7 and 8	58	45½	4 to 6	30	17
9 and 10	56	43½	7 and 8	29	16
11 and 12	55	42½	9 to 12	26	11

Butt Weld, extra strong, plain ends

⅛	43	26½	¼ and ⅜	+13	+48
¼ to ⅜	49	32½	½	23	7
½	55	44½	¾	28	12
¾	60	49⅛	1 to 2	34	18
1 to 1½	62	51½			
2 to 3	63	52½			

Lap Weld, extra strong, plain ends

2	55	44½	2	29	13
2½ to 4	59	48½	2½ to 4	34	20
4½ to 6	58	47½	4½ to 6	33	19
7 to 8	54	41½	7 and 8	31	17
9 and 10	47	34½	9 to 12	21	8
11 and 12	46	33½			

On carloads the above discounts on steel pipe are increased on black by one point, with supplementary discounts of 5 and 2½%, and on galvanized by 1½ points, with supplementary discounts of 5 and 2½%. On iron pipe, both black and galvanized, the above discounts are increased to jobbers by one point with supplementary discounts of 5 and 2½%.

Note.—Chicago district mills have a base two points less than the above discounts. Chicago delivered base is 2½ points less. Freight is figured from Pittsburgh, Lorain, Ohio, and Chicago district mills, the billing being from the point producing the lowest price to destination.

Boiler Tubes

Base Discounts, f.o.b. Pittsburgh

Steel		Charcoal Iron	
2 in. and 2¼ in.	38	1½ in.	1
2½ in.—2¾ in.	46	1¾ in.	8
3 in.	52	2 in.—2¼ in.	13
3¼ in.—3¾ in.	54	2½ in.—2¾ in.	16
4 in.	57	3 in.	17
4½ in. to 6 in.	46	3¼ in. to 3½ in.	18
		4 in.	20
		4½ in.	21

On lots of a carload or more, the above base discounts are subject to a preferential of two fives on steel and of 10 per cent on charcoal iron tubes. Smaller quantities are subject to the following modifications from the base discounts:

Lap Welded Steel—Under 10,000 lb., 6 points under base and one five; 10,000 lb. to carload, 4 points under base and two fives. Charcoal Iron—Under 10,000 lb., 2 points under base; 10,000 lb. to carload, base and one five.

Standard Commercial Seamless Boiler Tubes

Cold Drawn

1 in.	61	3 in.	46
1¼ to 1½ in.	53	3¼ to 3½ in.	48
1¾ in.	37	4 in.	51
2 to 2¼ in.	32	4½, 5 and 6 in.	40
2½ to 2¾ in.	40		

Hot Rolled

2 and 2¼ in.	38	3¼ to 3½ in.	54
2½ and 2¾ in.	46	4 in.	57
3 in.	52	4½, 5 and 6 in.	46

Beyond the above base discounts a preferential discount of 5 per cent is allowed on carload lots. On less than carloads to 10,000 lb., base discounts are reduced 4 points with 5 per cent preferential; on less than 10,000 lb., base discounts are reduced 6 points, with no preferential. No extra for lengths up to and including 24 ft. Sizes smaller than 1 in. and lighter than standard gages take the mechanical tube list and discounts. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Mechanical Tubing

	Per Cent Off List
Carbon, 0.10% to 0.30% base (carloads)	55
Carbon, 0.30% to 0.40% base	50

Plus differential for lengths over 18 ft. and for commercial exact lengths. Warehouse discounts on small lots are less than the above.

Non-Ferrous Metal Markets

Copper Weak—Tin Inactive—Lead Active—Zinc Higher

NEW YORK, June 16.

THE WEEK'S PRICES, CENTS PER POUND FOR EARLY DELIVERY

	June 16	June 15	June 13	June 12	June 11	June 10
Lake copper, New York	8.37½	8.37½	8.37½	8.37½	8.37½	8.37½
Electrolytic copper, N. Y.*	7.75	7.75	7.75	7.75	8.00	8.00
Straits tin, spot, N. Y.	22.75	22.75	....	23.20	23.25	23.00
Zinc, East St. Louis	3.40	3.40	3.40	3.40	3.37½	3.25
Zinc, New York	3.75	3.75	3.75	3.75	3.72½	3.60
Lead, St. Louis	3.60	3.60	3.60	3.60	3.60	3.60
Lead, New York	3.75	3.75	3.75	3.75	3.75	3.75

*Refinery quotation; price ¼c. higher delivered in the Connecticut Valley.

COPPER

Statistics for May, published June 12, were a distinct disappointment and decidedly bearish. Stocks of refined metal increased about 31,000 tons over those of April, bringing the total to 398,667 tons, the largest since 1921. There was a decline, however, of 3000 tons in blister stocks, reflecting the curtailment in mine output, but these stocks are still large at 190,578 tons, although the lowest in nine years. The effect of the statistics was the offering by custom smelters of electrolytic copper down to 8c., delivered in the Connecticut Valley, the same level as the lowest on record, touched one day last week. Since then there have been offerings enough of this character to keep the market at that level, though primary producers still hold their quotation at 8.25c. As under similar circumstances in the past, buying has dwindled, particularly from abroad, and total sales are at present insignificant. Copper Exporters, Inc., still maintains its price at 8.52½c., c.i.f. usual European ports. Previous to the break late last week, sales both here and abroad were fairly large, the total foreign sales to date being 27,000 tons. Lake copper is very quiet at 8.25c., to 8.37½c., delivered.

TIN

A report developed last week that a move was on foot to form a pool, or cartel, abroad to take up the surplus stocks of tin, and it is understood that a meeting on this subject is being held in Paris at this time. The effect of this report was to drive up prices at London, with a corresponding moderate advance here. On June 11 spot standard was forced up to £106 17s. 6d., brought about by general speculative buying. Since then, however, prices have declined until they are back nearly to the low levels of the past two or three weeks, with spot standard quoted at £101 15s., future standard at £103 7s. 6d., and spot Straits at £103 10s. The Singapore market today was £105 10s. In the market on this side there is absolutely no confidence and there was no buying to speak of on the advance in prices. Spot Straits tin was quoted in New York today at 22.75c., with light sales reported. Stocks in British warehouses for the week ended Saturday, June 13, were 31,367 tons, an increase of 427 tons. Shipments from the Straits for the month to June 13 inclusive have been 3975 tons, which is relatively large.

LEAD

Heavy buying of lead by practically all classes of consumers is reported for another week, and indications are that June consumption, and probably July, will surpass that of recent months. A feature has been the appearance in the market of some small consumers who have been out of the market for several months. The entire situation is more encouraging than in some time. Firmness in prices continues at 3.60c., St. Louis, or 3.75c., New York. One producer reports that its sales the past week have consisted mostly of July delivery

ZINC

Persistent reports of curtailment of output is offered as the explanation of the increase in prices during the week, which has been rather sharp. Prime Western zinc has advanced to 3.40c., East St. Louis, an increase of 15 points during the week. The reported curtailment resulted in forcing consumers to make larger inquiries. A factor in the situation has been the conviction that June, and even

New York, Chicago or Cleveland Warehouse

Delivered Prices, Base per Lb.

High brass	15.62½c.
*Copper, hot rolled, base sizes	18.12½c.
Seamless Tubes—	
Brass	20.50c.
Copper	20.62½c.
Brass Rods	13.87½c.
Brazed Brass Tubes	24.25c.

*Extra for cold-rolled, 3c. per lb.

New York Warehouse

Delivered Prices, Base per Lb.

Zinc sheets (No. 9), casks	9.00c. to 9.50c.
Zinc sheets, open	10.00c. to 10.50c.

Metals from New York Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	24.00c. to 25.00c.
Tin, bar	26.00c. to 27.00c.
Copper, Lake	10.00c. to 10.50c.
Copper, electrolytic	9.50c. to 10.00c.
Copper, casting	9.25c. to 9.75c.
Zinc, slab	4.50c. to 5.50c.
Lead, American pig	4.75c. to 5.75c.
Lead, bar	6.75c. to 7.75c.
Antimony, Asiatic	9.00c. to 10.00c.
Aluminum No. 1 ingots for remelting (guaranteed over 99% pure)	20.00c. to 22.00c.
Alum. ingots, No. 12 alloy	19.00c. to 21.00c.
Babbitt metal, commercial grade	20.00c. to 30.00c.
Solder, ½ and ½	17.75c. to 18.75c.

Metals from Cleveland Warehouse

Delivered Prices, per Lb.

Tin, Straits pig	27.50c.
Tin, bar	29.50c.
Copper, Lake	10.25c.
Copper, electrolytic	9.50c.
Copper, casting	9.00c.
Zinc, slab	5.50c.
Lead, American pig	4.75c. to 4.90c.
Lead, bar	7.75c.
Antimony, Asiatic	10.00c.
Babbitt metal, medium grade	15.00c.
Babbitt metal, high grade	31.50c.
Solder, ½ and ½	19.00c.

Old Metals, Per Lb., New York

Buying prices represent what large dealers are paying for miscellaneous lots from smaller accumulators and selling prices are those charged consumers after the metal has been properly prepared for their uses.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper, hvy. crucible	6.25c.	7.00c.
Copper, hvy. and wire	6.00c.	6.75c.
Copper, light and bottoms	5.00c.	5.75c.
Brass, heavy	3.25c.	4.00c.
Brass, light	2.50c.	3.50c.
Hvy. machine composition	5.00c.	5.75c.
No. 1 yel. brass turnings	3.75c.	4.50c.
No. 1 red brass or compos. turnings	4.50c.	5.25c.
Lead, heavy	2.50c.	3.00c.
Zinc	1.25c.	1.75c.
Sheet aluminum	9.50c.	11.50c.
Cast aluminum	4.00c.	6.50c.

July statistics, will be even more favorable than were those for May. Some substantial business has been booked during the week, although the volume has not been large, with prices fairly firm at 3.40c., East St. Louis, or 3.75c., New York. Contrary to expectations, there has thus far been no advance in ore prices, which still stand at $20 to $21 a ton. Sales for the week were small at 2830 tons, with production steady at about 5000 tons.

ANTIMONY

Demand is still light and stocks are plentiful, with the result that Chinese metal is again lower at 6.05c. a lb., New York, duty paid, for spot delivery, and 6c. for futures.

NICKEL

Electrolytic cathodes are quoted at 35c. a lb., with shot and ingot nickel made from remelted electrolytic at 36c. a lb. for single lots of spot metal.

ALUMINUM

According to published prices, virgin metal, 98 to 99 per cent pure, is quoted at 22.90c. a lb., delivered.

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Systematic Disposition of Inactive Stocks

(*Concluded from page* 1986)

ment of inactive stocks of the company to a minimum.

The idea behind these bulletins is, of course, to find a use for the stocks on company products either at our own works, or in one of the subsidiary plants, and thus secure the maximum value for them.

Fabricated parts, except such as cannot be classed as renewal parts for service, designed especially for specific apparatus, cannot be marketed. It is sometimes possible to find an application for fabricated parts, but this is quite rare; therefore, preventive measures must be depended upon to avoid accumulations of these stocks.

Causes for Excessive Stocks

There are three principal causes for materials and apparatus becoming excessive. The foremost among these is that materials or apparatus that are strictly modern today may be replaced tomorrow by better grades of material or more efficient apparatus. This statement should not, however, mean that all the apparatus is constantly being revised, as this is not true. Many standard lines exist that have not been changed for several years.

The second principal cause is the continuous effort to reduce manufacturing costs. Competition is quite keen in the electrical industry, and the designing engineer is constantly endeavoring to find equally suitable, yet lower-priced materials and to simplify designs so as to reduce costs of machining, assembling, etc. Whether the company's engineers or their competitors first accomplish these things makes no difference, the result is the same.

By the application of the methods described, a considerable decrease has been effected in the quantity of inactive and surplus stocks, and costs have been lowered.

Scrap Materials Segregated

Only that material which cannot economically be reworked into something that can be used is considered as scrap in the Westinghouse plant. While everything possible is done to prevent materials from getting into the classification of scrap, there still remains a large quantity that must be sold as such.

A salvage department handles all of this material, superintends the segregation of various grades of ferrous and non-ferrous metals and attends to their disposal. It has been found that the operation of such a department costs but a small part of the prices received for the scrap.

Scrap is prepared so as to bring the highest market prices. Sheet scrap, wire, clippings and turnings are put into a baling press and turned into 300-lb. bales, which are loaded by conveyor into a gondola car. Large bins are provided for the segregation of such metals as red brass, yellow brass, aluminum, copper, heavy melting steel, etc., which are thus kept separate. All cast iron parts such as brackets and frames are either remelted in the foundry or sold. Aluminum, copper and brass parts are sent to the foundry to be remelted.

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Chromium Plating Gives Longer Life to Dies

Chromium plating of new dies will prolong their life and thereby reduce their cost, stated V. J. Nicholl, president Nicholl-Hale Chrome Service, Inc., Detroit, in an address at a meeting of the Pressed Metal Institute at the Hotel Statler, Detroit, on June 4.

In the early days of plating dies with chromium, too much was left to the judgment of the customer in specifying what he wanted, his inexperience in these matters leading to poor service on the part of the plated material. Largely by means of education, the user has been convinced that he can secure the best plating job by relying on the plating company to decide specifications.

For salvaging used equipment, chromium plating is not successful in many cases. For instance, gages are allowed to get too much oversize or undersize before they are plated, thus requiring too thick a coating of chromium. One of the biggest mistakes made by customers is to insist upon too thick chromium plating which will not adhere to the metal as well as a thinner coat.

Thin-gaged metal will stand heavier chrome plating than thicker-gaged metal. To withstand the upsetting action while the dies are in operation, chrome should be applied to a hard steel which, nevertheless, must not be too hard, because the electric action of the chrome bath may then open up cracks. The most desirable hardness of steel for chrome plating is 50 to 52 on the Rockwell scale. Cast iron as well as tool steel can be plated with chromium.

The heaviest metal to which chromium plating can be applied is ¼-in. steel for brake drums, and in such instances plating has not always been successful. Toughness, not hardness, is the most desirable quality to be obtained from chromium plating.

In the Nicholl-Hale plant the plating cost is figured on a time basis. Every piece of material to be plated has a rack specially built for it and an annode shaped to it. One hour is allowed for every 0.001 in. of plating thickness. In some deep drawing work, both the punches and dies have been plated, but the latter is the more important of the two. Chrome cannot be used on the cutting surface, as it is too brittle and will break away from the metal.

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Foundry Equipment Makers Elect Officers

At a meeting of the Foundry Equipment Manufacturers Association in Cleveland, June 12, H. S. Simpson, National Engineering Co., Chicago, was elected president and J. P. Jones, General Electric Co., Schenectady, vice-president. These officers, with H. S. Hersey, C. O. Bartlett & Snow Co., Cleveland, M. C. Sammons, Wadsworth Core Machine & Equipment Co., Akron, Ohio, and H. J. Koch, Fort Pitt Steel Casting Co., McKeesport, Pa., compose the board of directors.

R. P. Dryer, who has been acting as secretary-treasurer for the association, resigned to devote his entire time to the Steel Office Furniture Institute, and D. M. Avey, the *Foundry*, Cleveland, was elected secretary-treasurer.

FABRICATED STRUCTURAL STEEL

New Projects of 35,000 Tons Include 14,000-Ton Chicago Tower —Awards Total 24,000 Tons

FABRICATED structural steel inquiry is 35,000 tons, compared with only 11,000 tons a week ago, and 21,000 tons two weeks ago. Included in new projects are 14,000 tons in a tower building for Chicago, 6100 tons in viaducts on the express highway being constructed in northern New Jersey, and 3700 tons in a bridge at Norco, La. It is noteworthy that of the total new business this week bridge construction in nine States contributes 14,000 tons.

Awards of 24,000 tons compares with 48,000 tons a week ago and 81,500 tons two weeks ago. Included are 6000 tons in the Continental Bank Building at Broad Street and Exchange Place, New York, 2000 tons for a race track pavilion in Glenview, Ill., and 2000 tons in a building for the Western Electric Co. in Chicago. Awards of bridges this week contribute 5500 tons to the total. Awards follow:

North Atlantic States

BOYLSTON, MASS., 300 tons, sanatorium and nurses' home, to an unnamed fabricator.

ERVING, MASS., 191 tons, State bridge, to an unnamed fabricator.

STATE OF RHODE ISLAND, 115 tons, buckle plates for Rhode Island dam, to McClintic-Marshall Corpn.

FORT LEE, N. J., 170 tons, field building for George Washington Memorial Bridge, to Belmont Iron Works.

NEW YORK, 120 tons, police station at Ozone Park, to Thor Structural Steel Co., Brooklyn.

NEW YORK, 260 tons, shed over slip 3, Whitehall Ferry Terminal, to Ingalls Steel Products Co.; erection by D. & M. Construction Co.

NEW YORK, 170 tons, addition to Rafel Building at Sixth Avenue and Forty-fourth Street, to Harris Structural Steel Co.

NEW YORK, 100 tons, Post Office in Borough of Richmond, to Berkshire Iron Works.

NEW YORK, 400 tons, public school No. 118 at Hollis, to Easton Structural Steel Co.

NEW YORK, 6000 tons, 45-story building for Continental Bank, to American Bridge Co.

NEW YORK, 270 tons, steel shorage, Queens anchorage, to McClintic-Marshall Corpn.

ALBANY, 115 tons, building alterations, to McClintic-Marshall Corpn.

NEWBURGH, N. Y., 470 tons, State armory, to McClintic-Marshall Corpn.

STATE OF NEW YORK, 200 tons, highway bridge, to American Bridge Co.

KINGSTON, N. Y., 450 tons, State armory, to McClintic-Marshall Corpn.

YONKERS, N. Y., 775 tons, high school, to George J. Schnatz Iron Works.

ERIE RAILROAD, 250 tons, bridge, to American Bridge Co.

NORRISTOWN, N. J., 170 tons, Dekalb Street bridge for Reading Railroad, to McClintic-Marshall Corpn.

DEAL LAKE, N. J., 500 tons, highway bridge, to McClintic-Marshall Corpn.

STATE OF NEW JERSEY, 370 tons, towers for Public Service Electric & Gas Corpn., to McClintic-Marshall Corpn.

ELIZABETH, N. J., 1740 tons, addition to Court House, to Oltmer Iron Works.

NEWARK, N. J., 300 tons, Eagle Fire Insurance Co. building, to Albert Smith & Sons.

STATE OF PENNSYLVANIA, 260 tons, lock gates for Lock No. 4, Monongahela bridge, to Independent Bridge Co.

BALTIMORE, MD., 275 tons, school, to American Bridge Co.

The South

STATE OF SOUTH CAROLINA, 130 tons, highway bridge, to Austin Brothers Bridge Co.

Central States

NORTH DAYTON, OHIO, 230 tons, Baltimore & Ohio Railroad bridge, to McClintic-Marshall Corpn.

BLUE ISLAND, ILL., 500 tons, Sag Canal bridge, to Milwaukee Bridge Co.

GLENVIEW, ILL., 2000 tons, race track pavilion, to United Iron & Wire Co., Chicago.

CHICAGO, 2000 tons, Western Electric Co., to Midland Structural Steel Co.

CHICAGO, 1000 tons, Garland Court substation for Commonwealth Edison Co., to American Bridge Co.

MINNEAPOLIS, 250 tons, bleachers at State fair grounds, to American Bridge Co.

SHAWANO, WIS., 275 tons, Wolf River bridge, to Wisconsin Bridge & Iron Co.

Western States

PHOENIX, ARIZ., 233 tons, Rio Puerco and Dry Creek bridges, Apache County, to an unnamed bidder.

SANTA CLARA, CAL., 1710 tons, Montalvo bridge, to Consolidated Steel Corpn.

SEATTLE, 200 tons, plates, tanks for Ford Motor Co., to Puget Sound Machinery Depot.

SEATTLE, 600 tons, bascule bridge, to Wallace Bridge & Structural Steel Co.

PORTLAND, ORE., 220 tons, Hell Gate bridge over Willamette River, Lane County, to an unnamed bidder.

SOUTH GATE, CAL., 300 tons, plates, bins and tanks for Philadelphia Quartz Co. plant; 250 tons to Consolidated Steel Corpn., and 50 tons to Western Pipe & Steel Co.

STRUCTURAL PROJECTS PENDING

Inquiries for fabricated steel work include the following:

North Atlantic States

WORCESTER, MASS., 1500 tons, war memorial building.

PROVIDENCE, R. I., 500 tons, Court House addition.

PROVINCETOWN, MASS., 230 tons, stand pipe.

BARTLETT, N. H., 170 tons, State bridge.

EVERETT, MASS., 160 tons, school.

WATERTOWN, MASS., 126 tons, academy.

BOSTON, 100 tons, International Harvester Co. distributing plant in Brighton district.

BUFFALO, 200 tons, repairs for four municipal bridges.

HINSDALE, MASS., 100 tons, State bridge.

NEW YORK CENTRAL RAILROAD, 400 tons, bridge at Woodlawn, New York.

STATE OF NEW JERSEY, 6100 tons, viaducts over State express highway, route 25, section 5, connecting with present construction.

PENNSYLVANIA RAILROAD, 1400 tons, electrification work.

HARRISBURG, PA., 500 tons, Y. M. C. A. building.

JAMESTOWN, N. Y., 1000 tons, Erie Railroad passenger station.

HEWLITTS POINT, N. Y., 1000 tons, generator house.

PHILADELPHIA, 1500 tons, Chestnut Hill grade elimination.

South and Southwest

NORCO, LA., 3700 tons, bridge.

OKLAHOMA CITY, 650 tons, viaduct.

Central States

CANTON, OHIO, 110 tons, Mahoning Road Bridge.

CHICAGO, 14,000 tons, tower building for World's Fair.

CHICAGO, 500 tons, public school repairs.

CHICAGO, 400 tons, Polish Women's Alliance.

STATE OF MINNESOTA, 300 tons, highway bridges.

CHICAGO, 200 tons, Kedzie Avenue substation for Commonwealth Edison Co.

Western States

LOS ANGELES, 175 tons, grand stand for fair grounds; Consolidated Steel Corpn. low bidder.

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Railroad Equipment

Shipments of railroad locomotives in May totaled 26 units, all steam type and for domestic use. Shipments in April consisted of 15 units, 13 steam and two electric, according to the Bureau of the Census. Unfilled orders at the end of May were reduced to 58 locomotives from 80 at the end of April.

United States Navy Department is asking for prices on two to six tank cars for transporting helium gas.

Port District Commission of Albany, N. Y., has ordered two gas-electric locomotives from Mid-West Locomotive Co.

Pacific Fruit Express is reported to be contemplating the purchase of 800 to 1000 refrigerator cars.

Chicago Great Western has ordered 500 steel box cars from Pullman Car & Mfg. Corpn.

Fruit Growers Express is in the market for 800 underframes.

Chicago Tunnel Transport Co. is inquiring for 400 tunnel cars.

Reinforcing Steel

New Projects of 7200 Tons—Awards Slightly Higher

ALTHOUGH lettings of reinforcing steel the past week, at 2550 tons, were slightly in advance of those in the previous week, the largest award included only 350 tons, which is for a unit for the Massachusetts Institute of Technology. Of the 7200 tons of new business, about 3800 tons will be used for highway bridges and 1695 tons for a Government dam in the State of Washington. Awards follow:

CAMBRIDGE, MASS., 350 tons, Massachusetts Institute of Technology unit, to Kalman Steel Co.

CAMDEN, N. J., 300 tons rail steel bars, Post Office, to Buffalo Steel Co.

BURLINGTON, N. J., 175 tons, generator station for Public Service Co. of New Jersey, to Joseph T. Ryerson & Son, Inc.

STATE OF NEW JERSEY, 110 tons, culvert and road work on routes 21, 25 and 29, near Newark, to Joseph T. Ryerson & Son, Inc.

WASHINGTON, 260 tons, gas holder foundations, to McClintic-Marshall Corpn.

STATE OF ILLINOIS, 150 tons, road work, to Kalman Steel Co.

STATE OF ILLINOIS, 300 tons, road and bridge work, to Calumet Steel Co.

SACRAMENTO, 268 tons, bridge over Santa Clara River, Ventura County, to an unnamed bidder.

SACRAMENTO, 114 tons, undergrade crossing in San Mateo County, to an unnamed bidder.

SACRAMENTO, 148 tons, paving in San Joaquin County, to an unnamed bidder.

OLYMPIA, WASH., 100 tons, two State paving projects, to Northwest Steel Rolling Mills.

SPOKANE, WASH., 275 tons, high school, to Northwest Steel Rolling Mills.

Reinforcing Bars Pending

Inquiries for reinforcing steel bars include the following:

STATE OF NEW JERSEY, 340 tons, highway bridge in northern New Jersey.

PHILADELPHIA, 200 tons, Women's Hospital building.

PHILADELPHIA, 300 tons, sewer at Mingo Creek, South Philadelphia.

WASHINGTON, 200 tons, Naval Air Station barracks at Anacostia, D. C.; bids opened June 17 by Bureau of Yards and Docks, Navy Department.

WASHINGTON, 100 tons, Post Office, Erie, Pa.; bids opened June 16 by general supervising architect, Treasury Department.

WASHINGTON, 100 tons, Post Office, Rutland, Vt.; bids opened June 16 by general supervising architect, Treasury Department.

WASHINGTON, 100 tons, Post Office, Hollowell, Me.; bids opened June 24 by general supervising architect, Treasury Department.

MONROE, LA., 350 tons, State highway bridge.

SHREVEPORT, LA., 1000 tons, State highway bridge.

ST. PAUL, MINN., 500 tons, packing plant for Swift & Co.

STATE OF WISCONSIN, 2000 tons, overhead highway crossing.

CLE ELUM, WASH., 1695 tons, dam for United States Bureau of Reclamation; bids opened.

SACRAMENTO, 240 tons, paving in Colusa County; bids opened.

SACRAMENTO, 100 tons, bridge over Coyote Creek, Santa Clara County; bids July 1.

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Wire Association Holds Meeting and Exhibit

CLEVELAND, June 16.—Another association has definitely been added to the technical organizations of the country in the case of the Wire Association. With an attendance expected to reach 400 or 450, the association is completing its first year with technical sessions today, Wednesday and Thursday in the Cleveland Auditorium. In connection with the meeting, an exhibition of wire drawing and forming machinery and wire mill apparatus is being held.

John Mordica, superintendent, rod and wire works, Bethlehem Steel Co., Sparrows Point, Md., is president, and L. D. Granger, chief metallurgist, Wickwire Spencer Steel Co., New York, and Herbert A. Horsfall, resident and managing director, Canada Wire & Cable Co., Ltd., Hamilton, Ont., are vice-presidents.

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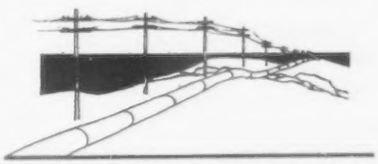

PIPE LINES

Shamrock Oil & Gas Co., Houston, Tex., has awarded contract to Fownes & Orr, Houston, for pipe line from Willow Springs in east Texas oilfield district to Houston, with gathering lines in three principal areas of oilfield, totaling 225 miles. Line will be built of 12½-in. pipe and will be used by independent east Texas oil operators. It will cost over $3,000,000.

Pennsylvania Power & Light Co., Allentown, Pa., has secured a right-of-way for a new natural gas pipe line from Tioga County to Williamsport, Pa., and vicinity. Work will begin soon.

Humble Pipe Line Co., operated by Humble Oil & Refining Co., Houston, Tex., has awarded contract to Oklahoma Contracting Co., Tulsa, Okla., for new line from Boggy Creek oilfield through Anderson County, connecting with present main lines. Company will build an additional line from Longview, Tex., to Shreveport, La., with gathering lines in oilfield district, to cost $1,350,000.

Industrial Notes

New Britain Machine Co., New Britain, Conn., this month is observing the 36th anniversary of its founding. During its career, beginning in June, 1895, the company has increased its capitalization from $200,000 to $3,713,300, exclusive of the $1,000,000 capital of the New Britain-Gridley Machine Co. The company had its start by absorbing the J. T. Case Engine Co., and at first manufactured steam engines. Subsequently it absorbed the Dubuque Specialty Machine Works and the George G. Prentice Co., and in 1912 added a pressed steel department. Recently the company received a substantial order for machines from Russia.

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Otis Steel Co., Cleveland, has placed orders for electrical equipment for its new cold-rolling mill. This will include two 1500-hp., 600-volt variable speed d.c. motors with a speed range of 200 to 400 r.p.m. for driving the mill and a 400-hp. motor for operating the reel and switchboard and control apparatus. The company also purchased about 50 mill-type auxiliary motors of from 6 to 100 hp. for driving various units in connection with its new 72-in. continuous sheet mill. All the equipment was purchased from the General Electric Co.

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General Electric Co. has completed its new $1,000,000 arc-welded transformer tank shop at Pittsfield, Mass. The building, which is 550 ft. long and 150 ft. wide, is built entirely of steel members, with great expanses of glass windows. Arc-welded steel pilasters used in place of the conventional brick pilasters has resulted in great saving of space and also decreased weight.

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Electric Hoist Manufacturers Association reports that the number of hoists ordered during May increased 12.2 per cent, compared with the previous month, and the value of such orders increased 18.87 per cent. Shipments were 17.68 per cent greater in May than in April.

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At the annual meeting of the St. Louis District Foundrymen's Club on May 28, W. C. Raithel, Century Foundry Co., was elected president; Harry Hubbell, Semi-Steel Casting Co., vice-president, and Leo J. Filstead, John C. Kuperfle Foundry Co., secretary-treasurer.

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Acme Steel Co., Chicago, declared the regular quarterly dividend of 62½c. a share on the capital stock payable July 1 to stockholders of record June 20. R. H. Norton, president, stated that every month since last December has shown an increase in sales over the preceding month, and that earnings are sufficient to justify the payment of the current dividend.

British Government Urged to End Boycott of British Products by India

(*By Cable*)

LONDON, ENGLAND, June 15.

THE *North England Ship Owners' Association has issued a statement* that it deprecates the use of British Government funds, or credits to assist in building new ships, or purchasing second-hand tonnage. The Midland Council, National Union of Manufacturers, is urging the Government to end the Indian boycott of British goods.

The Chinese Government has arranged to place substantial orders with British producers, purchases including railroad and bridge construction steel. The contracts, which will be awarded through a London purchasing commission of the Chinese Government, will total £3,500,000 ($17,010,000), representing the British allocation of the Boxer indemnity.

An agreement has been reached between the German Stee' Works Association and the Soviet Union for delivery to Russia of 200,000 tons of rolled steel, shipment to begin immediately and be completed within two months.

Belgian rail mills have received a contract for 12,000 tons, and Luxemburg producers for 3500 tons of rails for delivery to the Belgian Congo.

The Belgian-German wire cartel has advanced export prices on rolled wire from 1s. 6d. to 3s. (30c. to 72c.) per ton. French producers are negotiating with the Merchant Steel Bar Syndicate in an effort to fix prices and quotas for members. Manufacturers of galvanized products in Germany and Czechoslovakia are negotiating to establish a joint export sales organization.

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Chinese Government placing $17,000,000 worth of railroad and bridge steel with British makers.

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Soviet Union contracts with German Steel Works Association for delivery of 200,000 tons of steel in two months.

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Welsh Tin Plate Association ceases to function, and Germans find tin plate trade, which they have developed in Far East, is menaced by low prices.

* * *

International Tube Cartel will consider a proposal to distribute foreign markets among its members.

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Control of tin plate output by British mills has been abandoned by the Welsh Tin Plate Makers Association, leaving all producers uncontrolled on output or price.

General demand for tin plate has improved and business is being placed at 14s. and 14s. 6d. ($3.40 to $3.52) per base box, with slight concessions granted under special circumstances. Certain mills, which have been closed for some time, are preparing to resume operation.

The general business situation here is unchanged. Cleveland pig iron producers are endeavoring to secure orders in Scotland by granting concessions, but without success. Export demand for pig iron is negligible, but domestic sales are apparently sufficient to absorb most of the restricted production.

Hematite iron producers have been booking small orders at reduced prices, showing willingness to accept as little as £3 2s. ($15.55) on desirable orders for East Coast hematite, mixed numbers.

Finished steel markets are slightly more active as a result of domestic engineering construction. Steel mills have not yet replied to the request by shipbuilders that cheaper steel be furnished. Their attitude, however, is believed to be that additional business is unlikely to be attracted by reductions in prices.

British consumers of Continental semi-finished steel have been attracted by recent low offers and some fair tonnages of sheet bars have been sold here. The steel market is otherwise quiet, with finished products showing a tendency to decline in price.

Galvanized sheets are quiet and mills are openly offering to accept business at £9 15s. per ton (2.11c. per lb.), f.o.b., for No. 24 gage corrugated sheets in bundles.

French production in April consisted of 738,000 tons of pig iron, with 138 furnaces in blast at the end of the month, and 675,000 tons of raw steel.

French rolled steel output in April included 56,000 tons of railroad steel,

British and Continental European Export Prices per gross ton, f.o.b. United Kingdom Ports, Hamburg and Antwerp with the £ at $4.8665 (par)

British Prices, f.o.b. United Kingdom Ports

Ferromanganese, export	£9	0s.					$43.74	
Billets, open-hearth	5	0	to	£5	7½s.		24.30 to	$26.12
Black sheets, Japanese specifications	10	5					49.82	
Tin plate, per base box	0	14	to	0	14½		3.40 to	3.52
							Cents a Lb.	
Steel bars, open-hearth	7	17½	to	8	7½		1.71 to	1.81
Beams, open-hearth	7	7½	to	7	17½		1.60 to	1.71
Channels, open-hearth	7	12½	to	8	2½		1.66 to	1.76
Angles, open-hearth	7	7½	to	7	17½		1.60 to	1.71
Black sheets, No. 24 gage	8	10					1.84	
Galvanized sheets, No. 24 gage	9	15	to	9	17½		2.11 to	2.14

Continental Prices, f.o.b. Antwerp or Hamburg

Foundry iron, 2.50 to 3.00 per cent sil., 1.00 per cent and more phos.	£2	6s.	to	£2	7s.		$11.19 to	$11.42
Billets, Thomas (nominal)	£3	2s.	to	£3	2½s.		$15.07 to	$15.19
Wire rods, low C., No. 5 B.W.G.	5	0	to	5	5½		24.30 to	25.64
Rails, light	6	0					29.20	
Black sheets, No. 31 gage, Japanese	11	5	to	12	12		54.68 to	58.32
							Cents a Lb.	
Steel bars, merchant	3	7	to	3	10		0.73 to	0.76
Beams, Thomas, British standard (nominal)	3	6	to	3	7		0.72 to	0.73
Channels, Thomas, American sections	5	12	to	5	14		1.24 to	1.26
Angles, Thomas, 4-in. and larger, over ⅜-in. thick	3	7	to	3	8		0.73 to	0.74
Angles, Thomas, 3-in.	3	9	to	3	10		0.75 to	0.76
Hoops and strip steel over 6-in. base	4	0	to	4	2½		0.87 to	0.89
Wire, plain, No. 8 gage	5	0					1.09	
Wire, barbed, 4-pt. No. 12 B.W.G.	8	15					1.89	

67,000 tons of shapes, 23,000 tons of wire rods, 15,000 tons of drawn wire, 19,000 tons of steel hoops, 10,000 tons of tubes, 181,000 tons of steel bars, 8000 tons of tinplate, 47,000 tons of sheets and 26,000 tons of plates.

United Kingdom exports in May totaled 167,000 tons of iron and steel, of which 19,000 tons was pig iron.

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Scrap Prices in Germany at Low Level

BERLIN, GERMANY, June 1.—Steel scrap prices are registering a further decline. Recent quotations have been reduced to 15.50 m. ($3.69) a ton for bundled sheet cuttings and to 20.25 m. ($4.82) a ton, for No. 1 heavy melting steel, delivered in the Berlin district. As a result of these low prices, imports of scrap are at a minimum, and the scrap trade has requested the Government to modify the export restrictions. The Government has already permitted exportation of small quantities of scrap to Japan.

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German Tin Plate Mills Losing Export Trade

DÜSSELDORF, GERMANY, June 1.—Decline in authority of the Welsh Tin Plate Association, which has exercised control over production in the past, is causing some uneasiness on the part of German tin plate makers. German production costs are comparatively high, and further reduction in Welsh quotations may result in considerable curtailment of German exports of tin plate. Present prices are at a level which makes it difficult for German makers to compete in the Far Eastern market, a field developed by them in the past two years.

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Tube Cartel Proposes Division of Markets

DÜSSELDORF, GERMANY, June 1.—Distribution of foreign markets among members of the International Tube Cartel is being urged among other changes in its policy, but Belgian and American members are reported to be opposed to any such plan. The French and German members suggest allocations of markets, which would give to France exclusive rights in Rumania, Germany, the Turkish market, and to Great Britain all South African business. The French and German proposals will be discussed at the next cartel meeting the end of this month. It is noteworthy that membership of the various countries expires in different years. British participation ends in June of this year, American membership at the end of 1932, French in 1938 and that of other countries in 1940. Efforts to enroll Swedish tube mills have been unsuccessful.

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Germans Take Patents in United States

BERLIN, GERMANY, June 1.—In the past four years, 417 American patents have been granted to Germans, of which 156 were for improvement or accessory patents on existing machines, 101 on new designs of machines, 41 for alloy steels, 14 for light alloys, 38 for metallurgical developments and 67 for hardware products. In the same period the German patent office lists 165 patents to American companies or individuals for machines and metallurgical products.

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Japanese Oil Companies Buy Welsh Tin Plate

Recent purchases of tin plate by Japanese oil companies have been placed with Welsh makers, which are quoting highly competitive prices. The Ogura Oil Co., which inquired recently for 5000 boxes of oil can size for delivery at Yokohama in equal quantities on Sept. 10 and 20, has awarded the business to a British maker, which will furnish second quality, shipped in paper lined wooden boxes instead of tin lined. This is the third consecutive order placed by this oil company in England. The Kyoto Oil Co. has also bought British tin plate, placing about 6000 boxes of second quality, although this company was formerly a substantial buyer from American mills.

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Electrification Steel May Go to Germany

HAMBURG, GERMANY, June 3.—In addition to $50,000,000 worth of rail and track supplies to be bought by the German Railways Administration, aided by a credit from the Reichsbahn of 200,000,000 m. ($47,600,000), mills are awaiting award of an order from Belgium for electrification of the Antwerp - Brussels - Luxemburg railroad line. The total of this contract is about 70,000,000 m. ($16,660,000).

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Askania Corpn. of Berlin, Germany, has opened an American branch in Chicago at 1603 South Michigan Avenue. The company manufactures all types of automatic pressure regulators for mixing and controlling fuels and flow of gases. Sales are being handled in this country by H. A. Brassert & Co., Chicago.

German Bolt Cartel Buys More Plants

HAMBURG, GERMANY, June 3.—The recently organized Bolt and Nut Manufacturers Cartel is apparently functioning successfully. The Schrauben Union, formed by the cartel as a holding corporation to acquire small non-member companies and close the plants to reduce German capacity, has purchased 15 small works. Among the acquisitions is I. Tillmann & Co. of Cronenberg, one of the oldest bolt and nut manufacturing firms in Germany. Negotiations are announced by the union for purchase of four more plants. Many of the small and medium-sized bolt and nut works in Germany can be bought today at 25 to 30 per cent of the tax value. Industrial buildings without machinery and other equipment are worth from 10 to 15 per cent of their tax valuation. The membership of the Bolt and Nut Manufacturers Cartel at present is 23 companies, but the holding corporation in acquiring outside plants is retaining certain of the better equipped works, as reserve capacity, should there be increased demand in the future.

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German Motor Car Exports Gaining

HAMBURG, GERMANY, June 3.—The motor car industry is increasing its export business. In the first quarter of this year shipments of complete automobiles were 12 per cent more than in the same peried of 1930, while exports of motors and parts showed a 15 per cent increase. German manufacturers of motor cars have opened branch offices in foreign markets, including South America and the Far East. Of the total exports, 23.5 per cent was shipped from the Opel Motor Co. works (subsidiary of the General Motors Corpn.).

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Aluminum Cartel Holds Price Unchanged

HAMBURG, GERMANY, June 3.—The Continental Aluminum Cartel expects to continue the present quotation for aluminum ingots, £85 a metric ton (18.75c. a lb.) for the rest of this year. On large contracts, special concessions will be granted as in the case of recent Soviet purchases. Competition from American and Canadian producers is reported by the cartel to be much less keen than earlier in the year.

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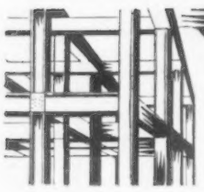
Poor & Co., Chicago, railway supplies, celebrated their twenty-fifth anniversary on June 6. The management, headed by Fred A. Poor, president, has remained intact since the company's incorporation.



PLANT EXPANSION AND EQUIPMENT BUYING

Large Machine Tool Order Placed

International Harvester Co. Buys About $200,000 Worth of Shop Equipment

IN an otherwise dull market, orders for about $200,000 worth of machine tools, placed at Chicago by the International Harvester Co., are the bright spot of the week. The new equipment will be used in the company's Chicago tractor plant, where preparations are said to be under way for the production of tractors for road construction.

Orders and inquiries in other sections of the country were slightly better in the past week than during any of the several preceding weeks. Some of the business that was placed had been held back for some time, purchasers having been influenced perhaps by some brightening in the general situation, including the partial recovery in the stock market.

The Navy Department is inquiring for 16 lathes for the Brooklyn Navy Yard. Action is expected shortly on 24 lathes for a high school in Chicago.

Machine tool orders in May declined, as compared with April, according to the monthly report of the National Machine Tool Builders' Association. The index figure for May orders was 87.2, while that for April was 105.1. March was the best month thus far in 1931, with an index of 117.6.

The average of orders for three months was higher at the end of May, however, than at the end of April, because of the fact that May orders totaled larger than those of February. The three months' moving average now stands at 103.3, compared with 102.1 at the end of April.

Shipments in May exceeded the orders received, so that the unfilled orders declined, being represented by the figure 231.9, compared with 238 at the end of April.

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NEW YORK

The Navy Department has issued an inquiry for 16 lathes of various sizes for the Brooklyn Navy Yard. The past week brought out a slightly larger volume of inquiry, mostly for single machines, and one or two dealers report that sales were larger than in any of the few weeks preceding. There is nothing to indicate, however, that the record for June will be any better than that of May.

CHICAGO

Of special interest in the local market are orders for $200,000 worth of machine tools placed by the International Harvester Co. This equipment is for delivery to the company's Chicago tractor plant where, it is understood, preparations are under way to produce tractors for road construction. A brass goods manufacturer has purchased a 14-in. lathe. The list of 24 lathes needed for the Austin High School, Chicago, is still in the hands of the school board committee which has made recommendations as to purchase, but final action may not be taken for a week or 10 days. The board has decided not to purchase an open-side planer, but still contemplates buying a 20-in. shaper and a milling machine. The trade does not expect bids to be taken on equipment for the Lane High School until some time in the fall.

CINCINNATI

A slight increase in orders for lathes was noted the past week. General demand, however, continues sluggish, and there is little in the market to indicate much interest of machine tool buyers. Inquiry also is slow. A manufacturer of electric refrigerators is inquiring for a milling machine, a shaper and four lathes. A local manufacturer of lathes received an order from a nearby board of education for seven small lathes.

NEW ENGLAND

Machine tool users, who some time ago made inquiries for tools, have not given up the intention to buy, but state that business conditions, while better than they were, do not yet warrant purchases of equipment. New England machine tool builders are doing less than at any time this year.

Small tool sales are holding up fairly well, but buying is on a hand-to-mouth basis. Certain makes of high-speed drills have been reduced 10 to 15 per cent. A New England manufacturer of files has guaranteed prices against a decline during the remainder of the year.

PITTSBURGH

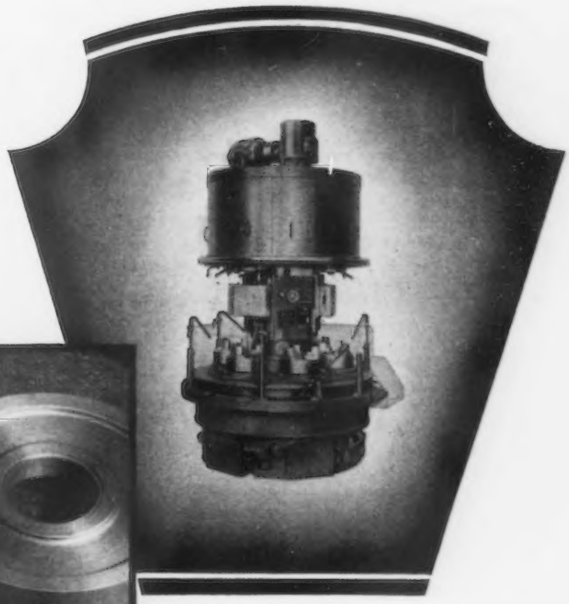
Machine tool dealers are getting occasional orders, usually as the result of considerable missionary work. New inquiry is extremely light and consists principally of tools needed at once. Repair parts are in fair demand.

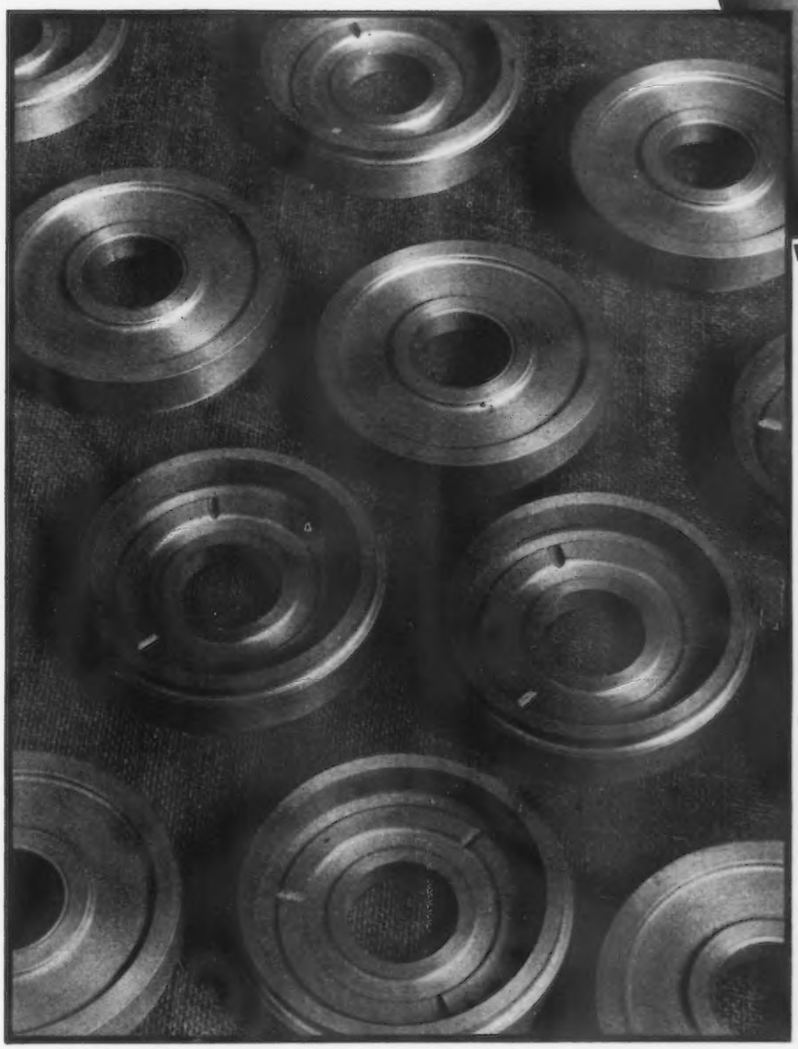
Placing of orders for electrical equipment in locomotives by the Pennsylvania Railroad resulted in releases of a few tools by the electrical equipment makers at East Pittsburgh and Erie. No new buying developed. The railroads themselves have no inquiries out and are not expected to do any buying before settlement of their request for increased freight rates. The boards of education in a number of nearby towns are in the market for a few tools.

CLEVELAND

Machine tool sales are confined to single tools. An occasional order for a machine for replacement is coming from the motor car industry in the Detroit territory. Dealers are attempting to secure orders from companies that in the past two or three months have sent out inquiries for machines, but the usual reply is that they will not buy until business picks up. The Chesapeake & Ohio Railroad is inquiring for a small lot of miscellaneous equipment.

BULLARD





BULLARDS MAY BE PURCHASED ON DEFERRED PAYMENT PLANS

Individual control of feeds and speeds at each spindle, flexible adaptability to varying quantities of identical pieces of work, low operative and maintenance expense combined make the Mult-Au-Matic Method most desirable where production costs must be reduced.

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New York

PLANS are under way by Sinclair Refining Co., 45 Nassau Street, New York, for rebuilding and modernizing former oil refinery of Pierce Oil Co., near Fort Worth, Tex., recently acquired, to cost over $1,000,000 with machinery. Work will include extensions in pipe lines for crude oil supply at plant.

Pittsburgh Plate Glass Co., Grant Building, Pittsburgh, has purchased building at 441 Exterior Street, Bronx, New York, totaling about 30,000 sq. ft. floor space, for new factory branch, storage and distributing plant.

Anthony Lombardi, 1221 Sheridan Avenue, New York, architect, has plans for a two-story automobile service, repair and garage building, 100 x 115 ft., to cost close to $100,000 with equipment.

Manhattan Auto Parts & Machine Shop, New York, recently organized by George Husselmann, 33-06 Thirty-fourth Avenue, Astoria, L. I., and associates, plans operation of local machine shop, including department for automobile parts manufacture.

Board of Water Supply, 346 Broadway, New York, will receive bids until June 30 for 10 iron sluice gates, 5 x 15 ft., and eight iron sluice gates, 6 x 15 ft., for Hill View Reservoir. Benjamin F. Einigier is secretary.

Bush Terminal Co., Bush Terminal, Brooklyn, with executive offices at 100 Broad Street, New York, contemplates a new group of buildings in Constable Hook district, Bayonne, N. J., for new branch terminal warehouses, including power house, mechanical-handling and other equipment. Entire project will cost more than $1,300,000.

Signal Supply Officer, Army Base, Brooklyn, is asking bids until June 24 for 24 armature assemblies and 50 magnetos, 760,000 ft. of wire, plugs, cartridge fuses, gaskets, etc.; until June 26 for repair parts for transmitters, rheostats, resistors, relays and other equipment.

Frederick Fricker, Inc., New York, has been organized by Frederick Fricker, Sr. and Jr., to take over and expand plant and business at 432 Eleventh Avenue, heretofore operated under name of Fred Fricker, manufacturer of electric signs and displays, parts, etc. Robert Fricker will also be an official of new company.

William Shary, 22 East Seventeenth Street, New York, architect, has filed plans for a four-story automobile service, repair and garage building, 66 x 100 ft., at 348-52 West Twenty-seventh Street, to cost close to $100,000 with equipment.

In addition to equipment valued at $77,739, recently purchased by Essex County Board of Vocational Education, Hall of Records, Newark, for new boys' vocational school at Bloomfield, now in course of erection, it is purposed to buy additional equipment later to cost close to $47,000, making total investment of close to $125,000 for tools and machinery. Robert O. Beebe is director.

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until June 24 for extensions and improvements in dirigible hangar at Naval Air Station, Lakehurst, N. J.

John C. Kohaut, Inc., 117 Green Street, Newark, operating a cabinet and woodworking plant, has awarded general contract to Pellechia Construction Co., 50 Branford Place, for a three-story and basement plant, 50 x 100 ft., to cost over $60,000 with machinery. Walter Snyder, Kinney Building, is architect.

Harry A. Cooper, 88 Hudson Avenue, Maplewood, N. J., and associates have organized Cooper Alloy Foundry Co., Newark, with capital of $125,000, and plan operation of local foundry for production of alloy castings. New company will be represented by Berlin & Berlin, 972 Broad Street, Newark, attorneys.

Weston Electrical Instrument Corpn., 614 Frelinghuysen Avenue, Newark, manufacturer of ammeters, voltmeters, parts, etc., has acquired plant and business of Jewell Electrical Instrument Co., 1650 Walnut Street, Chicago, manufacturer of kindred precision equipment, for price of about $775,000. Purchasing company will organize a subsidiary to operate Jewell company, which will continue as heretofore. Expansion will be carried out.

Cahill Steel Treating Co., 168 Bloomfield Avenue, Bloomfield, N. J., has consolidated with New Process Steel Treating Co., Newark. Operations will be concentrated at Bloomfield plant. F. Cahill heads company.

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Buffalo

FOLLOWING recent acquisition of plant of American Agricultural Chemical Co., William Street, Buffalo, by Darling & Co., 4201 Ashland Avenue, Chicago, manufacturer of commercial fertilizers, plans are under way for installation of additional equipment to double present capacity.

Fred R. Heilman, 394 Jersey Street, Buffalo, and associates have organized Heilman Electric Motor Repair, Inc., and plan operation of shop for electrical and mechanical equipment repairs, parts production, etc. Arthur J. Zeeman, 1240 Delaware Avenue, is interested in new company.

Pierce-Arrow Motor Car Co., 1695 Elmwood Avenue, Buffalo, is considering establishment of a new branch assembling plant in Canada.

Don-Bar Mfg. Co., Syracuse, N. Y., manufacturer of clothes-pressing machines, lawn shears, ventilators and kindred products, has purchased plant and business of Penn Spring Works, Lock Street, Baldwinsville, N. Y., manufacturer of steel springs and similar steel products, and will operate as a subsidiary. Expansion is contemplated.

Fried Select Vending Machine Corpn., Buffalo, recently organized by Irving Fried, 53 Brunswick Boulevard, and associates, plans operation of local factory for manufacture of vending machines, including parts and assembling.

Niagara-Hudson Power Corpn., Electric Building, Buffalo, has purchased Fulton Fuel & Light Co., Fulton, N. Y., heretofore a subsidiary of Great Lakes Utilities Co. Expansion is planned in Fulton district, including transmission lines.

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New England

FORMER factory buildings of Hartford Rubber Works, Park Street, Hartford, Conn., have been leased by Silent Glow Oil Burner Corpn., 1000 Capitol Avenue, for new plant for manufacture of oil burners and oil-burning equipment. Company will remodel buildings at cost of about $25,000 and expects to have plant ready for service in August.

Jenkins Brothers, Inc., Water Street, Bridgeport, Conn., manufacturer of valves and kindred engineering products, has awarded general contract to Hewlett Co., 886 Main Street, for one-story addition, 40 x 65 ft., to cost about $35,000 with equipment. Main offices are at 80 White Street, New York. Lockwood Greene Engineers, Inc., 100 East Forty-second Street, New York, is architect and engineer.

Grecian Iron Works, Inc., Cambridge, Mass., has been organized to take over and expand plant and business of company of same name at 204 Sydney Street, manufacturer of iron and other metal products, tools, etc. Alexander Spitzer is president and treasurer of new company.

Building Commission of Board of Selectmen, Framingham, Mass., is considering installation of manual training equipment in three-story addition to high school, to cost about $175,000, for which bids are being asked on general contract until June 23. G. F. Marlowe, 240 Boylston Street, Boston, is architect.

Merrimac Chemical Co., Everett, Mass., has awarded general contract to John F. Griffin Co., 250 Stuart Street, Boston, for one-story bi-sulphite unit, to cost about $50,000.

Union Casket Hardware Co., Springfield, Mass., has been organized to take over and expand plant and business of local company of same name, manufacturer of casket hardware and kindred products.

Simplex Tool Co., Woonsocket, R. I., following petition of Exchange Real Estate Co., has been placed in the hands of receiver. Frederic E. Starrett, Woonsocket, has been appointed permanent receiver in charge of winding up the company's business and the eventual liquidation of its assets.

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South Atlantic

CONTRACT has been let by Sylvania Industrial Corpn., 122 East Forty-second Street, New York, manufacturer of transparent cellulose paper products, to Hughes-Foulkrod Co., 1505 Race Street, Philadelphia, for three multi-story additions to mill at Fredericksburg, Va., to cost close to $1,000,000 with machinery. Ballinger Co., Twelfth and Chestnut Streets, Philadelphia, is architect and engineer.

Coast Artillery Corps, Submarine Mine Depot, Fort Monroe, Va., is asking bids until June 22 for 34 miles of one-conductor cable.

Fire, June 7, at Norfolk, Va., damaged and destroyed a number of industrial plants, including factory of American Peanut Co., with loss over $700,000 with machinery; shop of Gerloff Brazing Co., loss unestimated, and works of Godfrey Automobile Body Co., with loss over $24,000, including equipment. Different plants are planning early rebuilding.

American Hardware Co., Petersburg, Va., manufacturer of trunk hardware and other hardware products, has purchased plant of Southern Veneer Co., Thomasville, Ga., and contemplates establishment of new branch plant.

Constructing Quartermaster, Fort Monroe, Va., is asking bids until July 14 for a steam power plant for heating at

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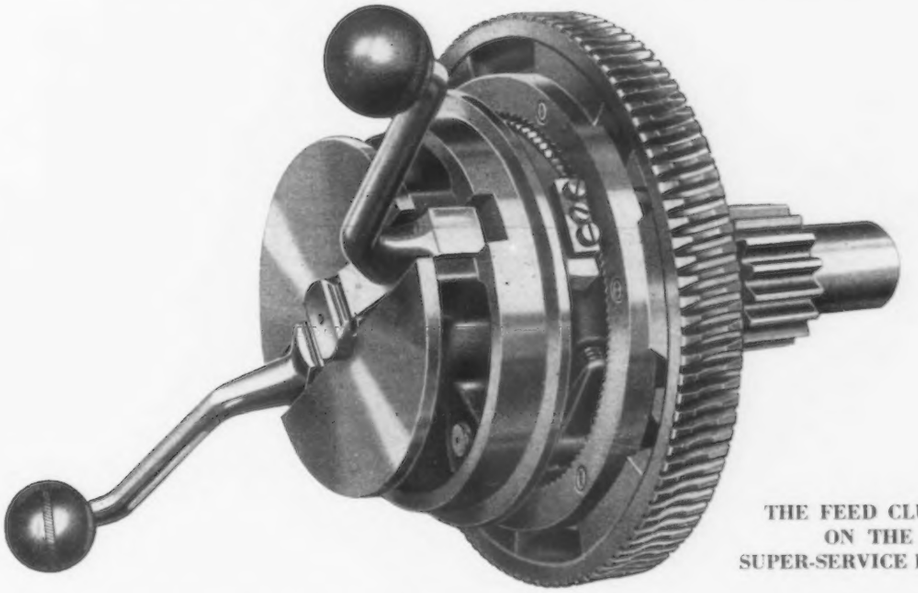

THE FEED CLUTCH
ON THE
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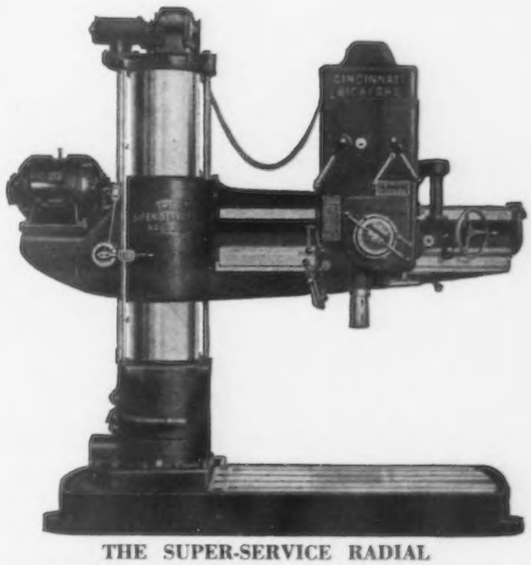
THE feed clutch on all radial drills turns slowly. This slow movement, coupled with the heavy feeding pressure required for big drills, puts an enormous load on the feed clutch. For the heavy feeds imposed in present day drilling practice something more powerful than the friction type of feed clutch is required.

On the SUPER-SERVICE Radial, a positive type of feed clutch is used. It consists of a large diameter, hardened steel ring with saw tooth serrations on its inner circumference. Two opposed, serrated segments are expanded into this ring by either of the quick-return levers. This clutch, without question, is the most powerful type that is used on radial drills. Powerful as it is, it engages with only a small fraction of the effort required to engage a feed clutch of the friction type. Unlike the ordinary, coarse tooth, positive clutch, it engages instantly at any position of the quick-return levers. . . . Another high-production, long-life feature of SUPER-SERVICE Radials.



THE SUPER-SERVICE RADIAL

THE CINCINNATI BICKFORD TOOL COMPANY

OAKLEY, CINCINNATI, OHIO

Langley field, for which an appropriation of $100,000 is available.

Carolina China Clay Co., Penland, N. C., recently organized by W. F. Deneen, head of North State Feldspar Co., Micaville, N. C., and associates, is planning installation of clay-mining plant at Penland, including steam drying equipment, pumps, milling presses, filter presses, conveying and other equipment. Initial building will be 40 x 100 ft. Entire project will cost over $70,000 with machinery.

Bureau of Yards and Docks, Navy Department, Washington, will receive bids until June 24 for hangar extension to aircraft shop at naval reserve aviation base, Squantum, Mass.

Virginia School Supply Co., Marshall Street and Hermitage Road, Richmond, Va., plans rebuilding part of plant recently destroyed by fire, with loss over $80,000.

Gaylord Container Co., 229 Grant Street, S. E., Atlanta, Ga., manufacturer of cardboard and paper boxes and containers, has filed plans for new one-story plant, 200 x 220 ft., to cost over $85,000 with equipment.

General Purchasing Officer, Panama Canal, Washington, will receive bids until June 25 for axles, cast iron pipe fittings, drill steel and other equipment; until June 23 for steel chains, metal-cutting band saws, 200-lb. wire electric welding rods, etc.

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Cleveland

DEPARTMENT of Public Service, Akron, Ohio, F. E. Swineford, director, will soon take bids for laboratory and buildings for Guggenheim Aeronautical Research Institute at municipal airport, to cost about $100,000 with mechanical equipment. M. M. Konarski, Central High School, is architect.

Board of Cuyahoga County Commissioners, Court House, Cleveland, has plans for a two-story equipment storage and distributing plant, 100 x 175 ft., with automobile service and repair unit, to cost about $140,000, including equipment. P. L. Koklauner, Court House, is engineer.

United Forgings, Inc., Beachwood Village, Ohio, care of Merrick, Arter & Steward, Terminal Tower Building, Cleveland, attorneys, recently organized by Charles Follett and Walker H. Nye, Cleveland, plans operation of local factory for manufacture of forgings and other iron and steel products.

City Auto Stamping Co., Toledo, Ohio, has been organized by officials of City Machine & Tool Co., Toledo Factories Building, and City Auto Stamping Co., Lint Avenue, to consolidate both interests and carry out general expansion. Amos Lint will be president of new organization. C. O. Miniger, president of Electric Auto-Lite Co., Champlain and Mulberry Streets, will be identified with new organization.

City Council, Lisbon, Ohio, has appointed committee to investigate proposal for a municipal electric light and power plant and secure estimates of cost.

Stark County Board of Education, Canton, Ohio, contemplates installation of manual training equipment in new three-story and basement high school, to cost about $175,000, for which bids are being asked on general contract until June 30. Firestone & Christman, Renkert Building, are architects.

United District Heating, Inc., Cleveland, has purchased plant of Welding Metals Mfg. Co., 4400 Perkins Avenue, Cleveland, which has conducted a commercial welding business. Purchasing company was organized in 1929 as engineer and contractor for construction of pipe lines and has been located in 71st-Euclid Building. E. R. Benedict is president and general manager of merged companies.

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Chicago

CONTRACT has been let by Edward Katzinger Co., 1949 North Cicero Avenue, Chicago, manufacturer of bakers' tinware and metal-ware specialties, to L. Balkin Co., 1852 West Austin Avenue, for a two-story addition, 209 x 220 ft., to cost about $150,000 with equipment. A. G. Alschuler, Steger Building, is architect. August Maag Co., Haven and Fleet Streets, Baltimore, a subsidiary, is erecting a three-story addition to cost over $100,000 with equipment, for which general contract recently was let to Consolidated Engineering Co., 20 East Franklin Street, Baltimore.

Ozarka, Inc., 122 West Austin Avenue, Chicago, manufacturer of radio equipment and parts, has leased five-story and basement factory at 1257-59 Fullerton Avenue for new plant. Present works will be removed to new location and additional equipment installed.

Universal Crusher Co., 625 C Avenue, N. W., Cedar Rapids, Iowa, manufacturer of crushing and pulverizing machinery and parts, has awarded general contract to E. D. Monilaw, 2246 First Avenue, S. E., for a one-story and basement addition, 65 x 156 ft., to cost close to $40,000 with equipment. Norman Hatton, Higley Building, is architect.

City Council, Vermilion, S. D., Frank Olds, chairman of building commission, will receive bids until June 29 for equipment for a municipal electric light and power plant, including engines and generator, motor-driven exciter, switchboard, fuel-handling system and accessories, to cost about $85,000. Charles A. Trimmer, Madison, S. D., is consulting engineer.

Plant and property of Mono Aircraft Corpn., and Lambert Aircraft Engine Corpn., Moline, Ill., manufacturers of airplanes, airplane engines, parts, etc., have been acquired from receiver by Philip Ball, owner of St. Louis American League Baseball Club, St. Louis, and associates. New owners plan reorganization of companies and resumption of operations.

City Council, Glidden, Iowa, is planning extensions and improvements in municipal electric light and power plant, including additional equipment, to cost about $60,000.

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Philadelphia

PLANS have been filed by Pennsylvania Sugar Co., Delaware Avenue and Shackamaxon Street, for a five-story power house, 70 x 74 ft., to cost about $70,000 with equipment.

Modern Fireproof Construction, Inc., Philadelphia, manufacturer of steel fireproofing products, has purchased one-story factory of Pawling System, Inc., steel specialties, Sixth Street, on site 201 x 204 ft., for new plant.

Department of Public Welfare, City Hall Annex, Philadelphia, has awarded general contract to Louis Lombardi & Brothers, 5115 Wakefield Street, for one-story addition to mechanical shop at House of Correction, Holmesburg, 46 x 68 ft., in connection with new two-story cell building, entire project to cost $259,990 with equipment. Philip H. Johnson, Architects Building, is architect.

National Fiberstok Envelope Co., 427 Moyer Street, Philadelphia, manufacturer of heavy paper goods, has taken over three-story factory at 800 Sixty-fifth Avenue for expansion.

E. R. Childs Auto Top & Body Service Co., 1410 Melon Street, Philadelphia, has leased 5000 sq. ft. in building at 1615 Melon Street for expansion.

Thorne Motor Co., Philadelphia, has leased building at 2854-56 North Watts Street for service and repair works for electric motor trucks.

Public Service Electric & Gas Co., Newark, N. J., has begun foundations for addition to electric generating plant at Burlington, N. J., to include installation of a new 18,000-kw. high pressure steam turbo-generator unit, high pressure boilers and accessory equipment, to cost close to $2,000,000. Plans are under way for transmission line from Burlington to Trenton. Company has secured permission to issue bonds in amount of $12,000,000 and 1,125,000 shares of common stock, part of proceeds to be used for expansion.

J. H. McCormick & Co., Williamsport, Pa., recently organized by John H. McCormick, foot of Susquehanna Street, and associates with capital of $100,000, will operate a local plant for manufacture of air compressors, pumps, fans, blowers and kindred products. R. K. Foster and Seth T. McCormick, Jr., both of Williamsport, are interested in new company.

Board of Education, Pottsville, Pa., plans installation of manual training equipment in new three and four-story and basement high school, to cost over $300,000, for which bids will be asked on general contract before close of month. William B. Ittner, Inc., Continental Building, St. Louis, is architect and engineer.

Robert P. Anderson, York, Pa., and associates have organized Bob Anderson, Inc., with capital of $50,000, and plan operation of automobile and motor truck repair plant, including parts manufacture, etc. Mr. Anderson will be treasurer. S. B. Meisenhelder and A. T. Fishel, both of York, are interested in new company.

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Cincinnati

PLANS are being considered by Sun Oil Co., 1608 Walnut Street, Philadelphia, for a new bulk oil storage and distributing plant at Cincinnati, fronting on Ohio River, including power house, pumping station, machine shop and other structures, to cost over $400,000 with equipment. K. W. Cunningham, 1241 Chase Street, Cincinnati, is district manager.

Heinss Spading Machine Co., Cincinnati, care of W. J. Schultz, First National Bank Building, recently organized with capital of $100,000, plans operation of local plant for manufacture of earth-moving machinery and parts. A. D. Fisher and John Sauer, Cincinnati, are heads.

Brown-Brockmeyer Co., Inc., Norwood Avenue, Dayton, Ohio, manufacturer of

IF you want to reduce your operating expenses..

NOTE the advertisements in this issue containing ideas that you can use. You will find many of them. A few specimens:

● ***Sagging Point of this new Brick is 300 deg. F. Higher*** . . . A half dozen advantages are claimed for an improved chrome brick. Among them are less spalling, greater resistance to penetration of destructive elements, higher hot load strength.

● ***Hydraulic Spray Valve*** . . . Instantaneous operation of this valve enables it to control accurately large volume of water delivered at high pressure.

● ***200-Cell Battery Operates 50-ton Locomotive for Switching Service*** . . . Momentary overload capacity is large. Battery trays and cells are interchangeable. Maintenance costs have been reduced.

● ***Improved Inserted Tooth Metal Saw*** . . . New construction is said to give lower cutting costs.

● ***Traveling Crane Is All-Welded Construction*** . . . Ten-ton capacity, 97-ft. span, crane has bridge girders, end trucks and trolley frame of all-welded construction.

Men who are successful in economical plant operation make it a habit of going through the advertising pages of The Iron Age each week.

fractional horsepower motors, parts, etc., has awarded general contract to Henry Stock & Son, 55 Brandt Street, for one-story addition, 90 x 500 ft., to cost about $100,000 with equipment.

Contracting Officer, Wright Field, Dayton, Ohio, is asking bids until June 29 for 410 handle assemblies; until June 22 for two tractors.

Knox County Board of Education, Knoxville, Tenn., is planning installation of manual training department in new central high school at Fountain City, Tenn., to cost $200,000, for which bids will soon be asked on general contract. Bauman & Bauman, 815 Market Street, Knoxville, are architects.

Hillerich & Bradsby Co., Louisville, manufacturer of baseball bats, golf club shafts and kindred turned wood products, is planning to rebuild plant recently destroyed by fire, with loss reported over $300,000 including equipment.

United States Engineer Office, McCall Building, Memphis, Tenn., will receive bids until June 26 for three gasoline engines, 20-25 hp., each.

B. Manischewitz Co., 2100 West Eighth Street, Cincinnati, operating a baking plant, has purchased property at 141-51 Bay Street, Jersey City, N. J., and will remodel for eastern branch baking plant to cost over $85,000, including ovens, power equipment, conveying and other machinery.

Phillips Pump & Tank Co., Cincinnati, care of Bolsinger & Bolsinger, American Building, attorneys, recently organized, plans operation of local factory for manufacture of pumping machinery and parts, tanks and other sheet metal products. Hyman Phillips heads company.

Shartle Machine Co., Columbus, Ohio, is inquiring for two 125-kw. to 175-kw. a.c. engine generator units.

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Milwaukee

BOARD of Water Commissioners, Racine, Wis., has rejected bids for a $660,000 pumping and filtration plant enlargement project, but intends to readvertise for new bids shortly. Alvord, Burdick & Howson, consulting engineers, 20 North Wacker Drive, Chicago, are in charge.

General Box Co., 1514 North Seventeenth Street, Sheboygan, Wis., and 508 North Dearborn Street, Chicago, closed bids June 16 for erection of a new plant designed by Frank D. Chase, Inc., 720 North Michigan Avenue, Chicago, to cost $200,000 complete. Merton C. Hillyer is vice-president in charge.

Bids close July 6 for first unit of new $1,000,000 high school in Whitefish Bay, Milwaukee suburb, designed by M. Tullgren & Sons Co., architects, 1234 North Prospect Avenue, Milwaukee. Building will be tee-shaped, 520 x 250 ft., three stories and basement. First unit includes steam generating plant with oil-burning equipment, water purifying plant, ventilating system, unit heaters, etc. W. A. Klatte is secretary of school board.

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St. Louis

WORK is under way by Mountain Ice Co., Leeds, Mo., an interest of City Ice & Fuel Co., 6611 Euclid Avenue, Cleveland, on new ice and car-icing plant, with main two-story unit, 100 x 100 ft., and one-story building, 60 x 120 ft., to cost over $300,000 with machinery.

Federal Barge Line, East St. Louis, Ill., is planning replacement of equipment recently damaged in fire at local dock with loss of about $50,000, including two loading cranes.

Board of Trustees, Agricultural and Mechanical College, Magnolia, Ark., will receive bids until June 24 for one deep-well centrifugal pump, motor-driven, with capacity of 150 gal. a min., and for one steel tank, 25,000-gal. capacity, on 75-ft. steel tower.

Board of Works, Oklahoma City, Okla., is planning early call for bids for a one-story hangar at municipal airport, 120 x 140 ft., with repair and reconditioning facilities, to cost close to $40,000 with equipment. Langbein & Johnson, Oklahoma City, are architects; George F. Brown, Petroleum Building, is engineer.

Symns-Shafer Mercantile Co., Colby, Kan., has taken bids on general contract for a one and two-story cold storage and refrigerating plant, 60 x 240 ft., to cost close to $60,000 with machinery. Benjamin H. Byrnes, National Bank of America Building, Salina, Kan., is architect.

Board of Public Service, City Hall, St. Louis, will receive bids until June 30 for electric equipment for power station at St. Louis waterworks, including one 400-kw. d.c. generator and one 200-kw. a.c. generator, both direct-connected to steam engines, with accessories.

Eagle-Picher Mining & Smelting Co., Picher, Okla., operated by Eagle-Picher Lead Co., 134 North La Salle Street, Chicago, has acquired site for a new lead mill to cost close to $375,000 with machinery.

G. A. Brown, Brentwood, Mo., and associates have organized P-B Chain Mfg. Co., St. Louis, with capital of $30,000 and plan operation of factory for manufacture of anti-skid steel chains for automobiles and chains for other service.

Kansas Power Co., Salina, Kan., contemplates early call for bids on general contract for a new two-story and basement power plant at Fort Dodge, Iowa, 50 x 125 ft., to cost over $100,000 with machinery. Sargent & Lundy, Inc., 20 North Wacker Drive, Chicago, is consulting engineer.

Grant Storage Battery Co., Omaha, Neb., manufacturer of electric storage batteries, plates, etc., is planning to rebuild part of plant recently destroyed by fire, with loss about $40,000 including equipment.

Board of Education, Tekamah, Neb., contemplates installation of manual training equipment in new two-story and basement high school to cost about $140,000 for which bids have been asked on general contract. Meginnis & Schaumberg, Federal Trust Building, Lincoln, Neb., are architects.

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Gulf States

PLANS are being considered by Guiberson Corpn., South Dallas, Tex., manufacturer of oil well equipment, drilling tools, etc., for a new plant at Love Field, Dallas, for production of Diesel aircraft motors, including parts and assembling. Company has recently perfected new Diesel engine unit for purpose noted, using crude oil as fuel, and will develop as a new branch of business.

State Board of Control, Austin, Tex., Roy I. Tennant, purchasing division, is asking bids until July 6 for hardware, tools and other equipment and supplies for State institutions.

Port Arthur Planing Mill Co., Lakeshore Drive and Canal Street, Port Arthur, Tex., has plans for a new one-story mill, 100 x 100 ft., to cost close to $40,000 with machinery.

Board of Education, Independent School District of Gregg County, Longview, Tex., is considering installation of manual training equipment in a new junior high school, for which plans will soon be drawn. A special election has been called on June 30 to approve a bond issue of $175,000 for this and other school work. H. L. Foster is superintendent of schools.

E. W. Moutray, Abilene, Tex., is at head of project to erect an oil refinery near Hawley, Tex., to cost over $180,000 with equipment. A company will be organized to carry out project.

American Tar Products Co., Fairfield, Ala., has started rebuilding part of local plant recently destroyed by fire and will erect a number of new units. Program will cost over $500,000 with equipment. Headquarters are in Koppers Building, Pittsburgh.

City Clerk, Leland, Miss., is asking bids until June 30 for one oil-burning engine of 600-hp. rating, and one pumping unit, dual drive type.

Board of Trustees, United Vocational School, Fayette, Miss., has asked bids on general contract for a new one-story school unit and will soon begin superstructure. State Department of Education, Jackson, Miss., architectural department, prepared plans.

Constructing Quartermaster, Maxwell Field, Montgomery, Ala., is asking bids until July 7 for an underground fueling system for airplanes.

Joseph Sanger, San Angelo, Tex., is at head of project to erect a new oil refinery near city. A refinery has been taken over at Pioneer, Tex., and equipment will be used in proposed plant with purchase of considerable new machinery. Entire project will cost over $90,000. A company will be organized to carry out project.

Cocoanut Products Co., Miami, Fla., recently organized by W. C. Hill, president, Third National Bank, and associates with capital of $100,000, is planning establishment of local plant for production of cocoanut pulp for use in food products, to cost over $40,000 with crushing, grinding, conveying and other equipment.

Alabama Power Co., Birmingham, has awarded general contract to Pate-Cox Construction Co., Atmore, Ala., for a one-story equipment storage and distributing plant at Atmore, with repair facilities.

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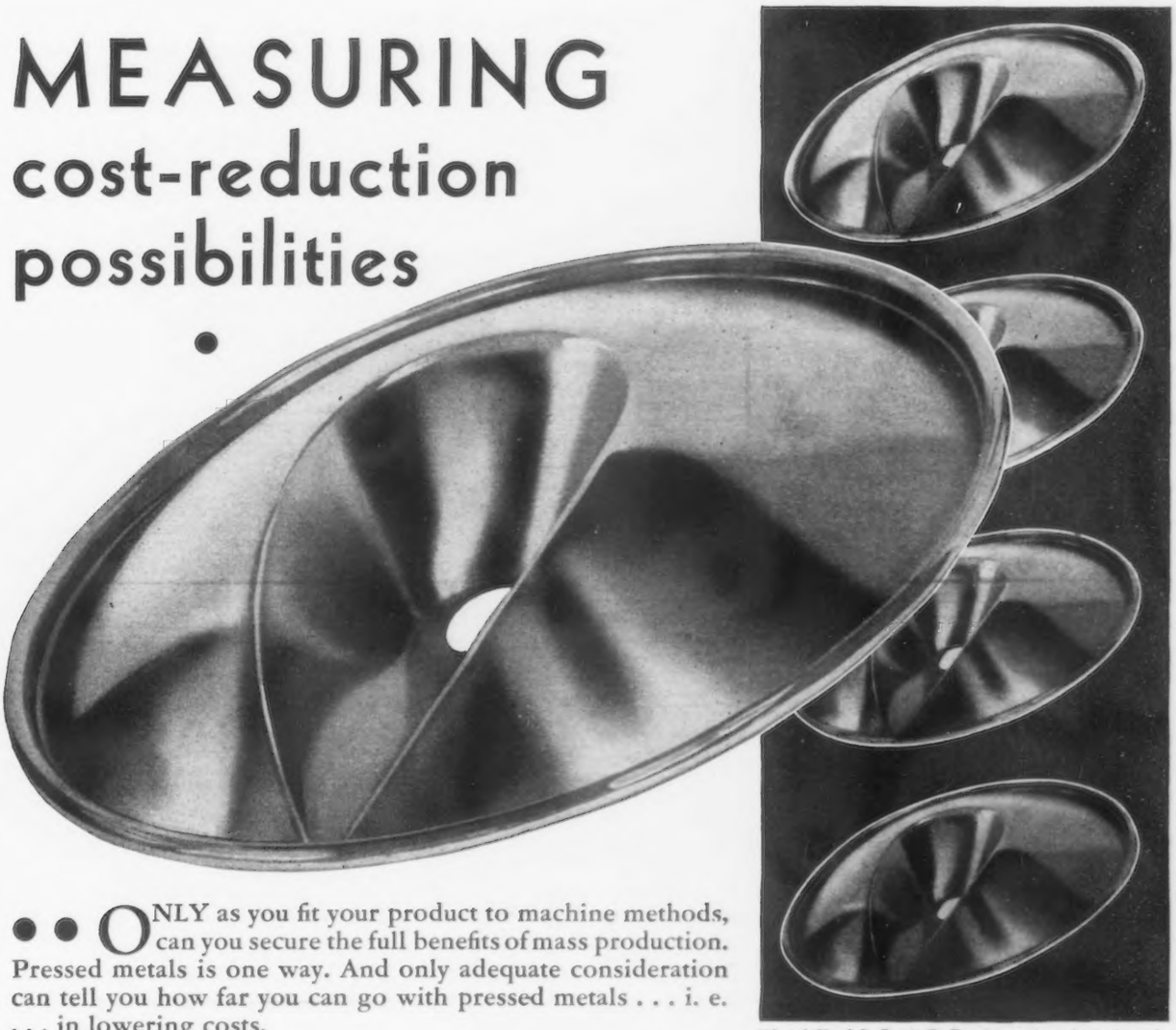
Detroit

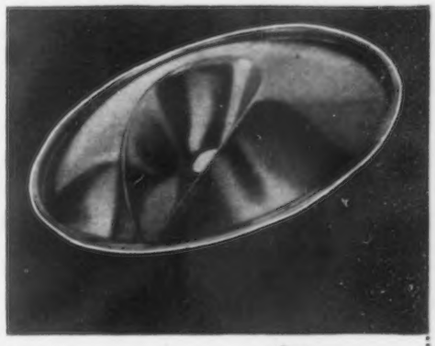
CONTRACT has been let by Thunder Bay Quarries Co., Alpena, Mich., to W. J. Meagher Co., Bay City, Mich., for a new pier and loading dock on Thunder Bay, to cost over $85,000. Mechanical-loading and other material-handling equipment will be installed.

Norge Corpn., 7601 Central Avenue, Detroit, manufacturer of electric refrigerating equipment and parts, a division of Borg-Warner Corpn., Chicago, has plans to double present capacity. Addi-

MEASURING cost-reduction possibilities



The skill of G. P. & F. Engineers is reflected in the designing of this washing machine cover. It is 21 inches in diameter and presents an interesting study in stamped and drawn one-piece design.



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G. P. & F. has solved many problems of turning intricate castings over to pressed-metal production . . . saving not only in production cost but in weight, in amount of material used, in machining and finishing.

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A-4457

tional machinery will be installed. Company has doubled working force since first of year.

Premier Weighing Machine Co., 6230 Second Boulevard, Detroit, recently organized with capital of $50,000, plans operation of local factory for manufacture of coin-controlled weighing machines and scales. Arthur J. and Adolph A. Caille, 1735 Virginia Avenue, are heads.

Lapeer Trailer Corpn., Lapeer, Mich., manufacturer of motor trailers and parts, has merged with Trailmobile Co., Thirty-first and Robertson Streets, Cincinnati, manufacturer of kindred equipment, and Trailer Co. of America, Inc., has been organized to carry out consolidation. Both plants will be continued at present locations.

Board of Education, Quincy, Mich., is considering installation of manual training equipment in new two-story and basement high and grade school to cost about $170,000 for which bids have been asked on general contract. Lane, Davenport & Bennett, Inc., Charlevoix Building, Detroit, is architect.

Sparks-Withington Co., Jackson, Mich., manufacturer of radio equipment, automobile accessories, etc., has developed a new movie talking machine for home use, to be known as Visionola, and plans extensive production. Plant is now giving employment to about 1200 operatives and this force will be increased to more than 3500 persons during next three months.

Board of Trustees, Olivet College, Olivet, Mich., has approved plans for a new power house to cost over $35,000 with equipment, and work will be started soon. Bowd & Munson, Lansing, Mich., are architects.

Evans Products Co., Union Guarantee Building, Detroit, manufacturer of automobile loading devices and equipment, has perfected a new car-loading device, to be known as "automobile floor-anchoring device," and will develop large output in about 60 days.

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Indiana

PLANS are under way by Blish Milling Co., Seymour, for expansion improvements at local flour mill, including additional machinery, to cost $150,000.

Board of Trustees, University of Notre Dame, South Bend, has awarded general contract to Ralph Sollitt & Sons, 518 East Sample Street, for a new two-story and basement engineering school unit, to cost close to $500,000 with equipment. F. W. Kervick, architectural department of university, is architect. Robert Hattis, 6 North Michigan Avenue, Chicago, is mechanical engineer.

National Autohaven Co., 201 North Wells Street, Chicago, has plans for a group of service, repair and garage buildings in a number of cities, including Gary, Hammond, Fort Wayne, Kokomo, Michigan City and other points, each three stories, entire project to cost over $500,000 with equipment. Company will also erect similar units in cities in Illinois, first building to be located at Crete. A. J. Williams is general manager.

Liberty Aircraft Sales & Mfg. Co., Lambert Field, St. Louis, specializing in production of two-seated monoplanes, considering a new plant at or near municipal airport, Indianapolis. Existing building will be leased and equipment installed. Charles E. Cox, Jr., superintendent at Indianapolis airport, is in charge.

Portable Power Tool Corpn., Warsaw, has arranged for an increase in capital from 4500 to 15,000 shares of stock, no par value, part of proceeds to be used for expansion.

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Pittsburgh

COUNTY CONTROLLER Robert G. Woodside, County Office Building, Pittsburgh, is asking bids on general contract until June 23 for a pumping station and oil storage and distributing building at municipal airport, Mifflin Township.

Ultra-Penn Refining Co., Butler, Pa., recently organized with capital of $200,000, will take over and operate a local oil refinery. Extensions and improvements are planned. Frank C. Dobbs and H. C. Eaton, Butler, head new organization.

Pittsburgh & Lake Erie Railroad Co., Terminal Building, Pittsburgh, is asking bids until June 26 for axles and tubes to cover requirements for last half of year. J. H. James, address noted, is purchasing agent.

Springdale Foundry Co., Springdale, Pa., recently formed by George Chismark, Seventh and Mill Streets, Tarentum, Pa., and associates, has approved plans for new one-story foundry, 50 x 125 ft., on site adjoining Pennsylvania Railroad, to be ready for occupancy late in July. Company will specialize in iron and steel castings. Initial plant will cost about $35,000 with equipment.

Board of Education, Monaca, Pa., contemplates installation of manual training department in new two-story and basement junior high school to cost about $175,000, for which plans have been completed by Stetson & Bradley, 719 Franklin Avenue, Aliquippa, Pa., architects.

New River Co., MacDonald, W. Va., has awarded contract to Interstate Equipment Corpn., New York, for installation of an aerial tramway for disposal of mine refuse at its Lochgelly mine.

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Pacific Coast

CONTRACT has been let by Progressive Transportation Co., 8081 South Alameda Street, Compton, Cal., to A. S. Emerson, Compton, for one-story shop building, with 400-ft. crane runway for electric traveling crane, to cost over $40,000 with equipment.

Southern California Edison Co., Los Angeles, is planning erection of new power substation in Beverly Hills district, to cost about $150,000 with equipment.

Pacific Gas & Electric Co., 445 Sutter Street, San Francisco, has arranged for a new stock issue to total $14,185,550, part of proceeds to be used for extensions and improvements in power plants and system.

Board of Education, Olinda High School District, Olinda, Cal., has plans for a one-story and basement vocational school at Brea, Cal., 58 x 106 ft., with electric shop, automobile repair shop and other units, to cost about $35,000 with equipment. T. C. Kistner & Co., Architects Building, Los Angeles, are architects.

Braun Corpn., 363 New High Street, Los Angeles, manufacturer of scientific instruments and equipment, laboratory apparatus, etc., has awarded general contract to Stanton-Reed Co., 816 West Fifth Street, for two-story and basement storage and distributing plant, 85 x 400 ft., to cost close to $100,000 with equipment. Walker & Eisen, Western Pacific Building, is architect.

Eighth Army Corps Area, San Antonio, Tex., Col. A. G. Fisher, in charge, is planning a new army hangar with repair facilities at airport at Tucson, Ariz. An appropriation of $85,000 will be available for unit on July 1.

Superior Felt & Paper Co., Inc., Seattle, recently organized with capital of $400,000 by Ray E. Stanley, Seattle, and associates, has acquired 340,000 sq. ft., as site for a new mill for production of roofing papers, roofing felts, wallboard and kindred products, to cost close to $200,000 with equipment.

Chief Engineer, National Park Service, Underwood Building, San Francisco, is planning installation of a power plant in Rainier National Park, Wash., for which an appropriation of $68,000 is available.

Spaulding Pulp & Paper Co., Newberg, Ore., is considering expansion and improvements, including additional equipment. Company is arranging bond issue of $300,000, part of fund to be used for work.

Pacific Hardstone Brick Corpn., Los Angeles, which will erect a new plant for manufacture of sand-lime brick, will invest about $200,000 in buildings and equipment, and not $70,000 as previously stated.

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Canada

SAWMILL at Spragge, Ont., owned by J. J. McFadden Lumber Co., recently destroyed by fire with loss of $200,000, will be rebuilt at once. Company is interested in new equipment and machinery.

Wright's Ropes, Ltd., Birmingham, England, manufacturer of wire rope, etc., has purchased plant of Vancouver Wire Rope Works, Ltd., on Industrial Island, Vancouver, B. C. Plant improvements will be made and new machinery installed.

Standard Iron Works, Ltd., Edmonton, Alta., will start work at once on rebuilding part of its plant, recently destroyed by fire. New plant will cost $150,000 and includes structural and machine shop, foundry, pattern shop and office building. New equipment will be purchased.

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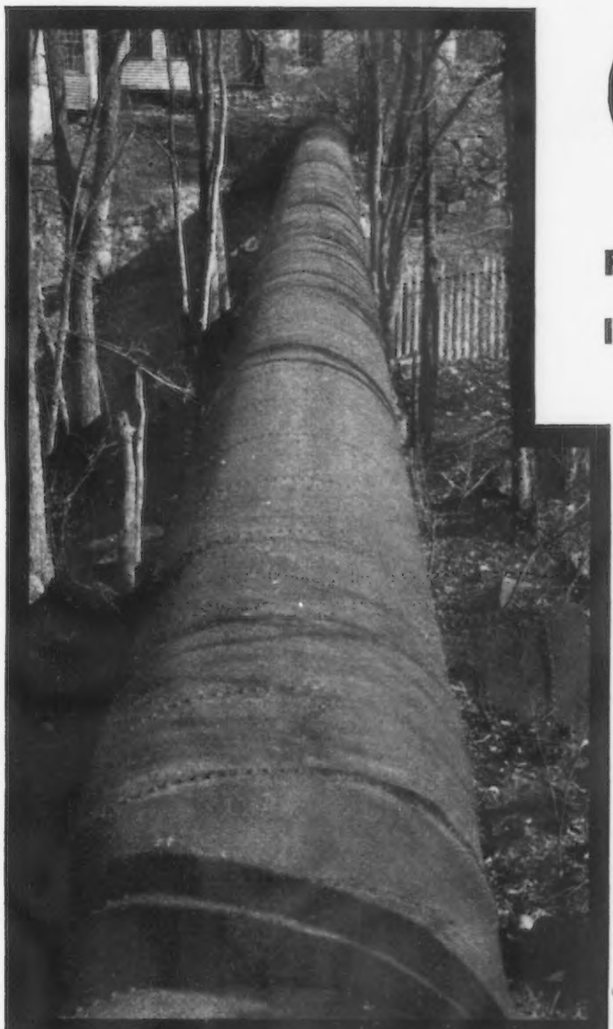
Foreign

A CONCESSION has been granted by Irak Parliament, Bagdad, Irak, to Irak Petroleum Co., Mosul, Irak, for an oil pipe line from Mosul to Kirkuk, with two branches from that point to Tripoli and Haifa, respectively. Project will total 1200 miles, and will cost over $10,000,000 with pumping stations, storage and distributing plants, and other units. It is scheduled to be ready for service in 1935. Irak company is owned jointly by D'Arcy Exploration Co., London, England; Royal-Dutch-Shell Oil Co., Amsterdam, Netherlands; Campagnie Francaise des Petroles, Paris, France; and Near East Development Co., allied with Atlantic Refining Co., 260 South Broad Street, Philadelphia; Pan-American Petroleum & Transport Co., 122 East Forty-second Street, New York, and other American interests.

TWO WATER CONDUITS PROVE ONE



FACT ABOUT WROUGHT-IRON PLATES

A city in the western section of New York State utilizes a lake 27 miles away for its domestic water supply.

In 1875, a conduit of 36-inch and 24-inch pipe was completed. Approximately 13 miles of this conduit was constructed of wrought iron plates.

In 1895—twenty years later, because of the growth of the city, a second conduit was completed. Geographically, it paralleled the first conduit. *But it was NOT wrought iron.*

Now, consider these amazing facts in a comparison of service:

The wrought iron conduit developed its *first* hole due to corrosion twenty years after completion. The other conduit developed its first hole due to corrosion *six* years after completion.

In a period of *38* years covered by official records, the wrought iron conduit developed a total of *36* holes. In a period of *18* years, the conduit not made of wrought iron developed a total of *727* holes!

These two conduits prove this *one* fact: Water conduits made of wrought iron plates are better, in every case, than conduits made of other materials. And because of accurate control of physical and chemical characteristics that modern manufacturing permits, Byers Genuine Wrought Iron is *better* than any wrought iron ever produced. "The Autobiographies of Two Water Conduits," filled with vital facts and official comparisons, will be mailed free upon request. A. M. Byers Company, Pittsburgh, Pa. Established 1864.

These are the BYERS Genuine Wrought Iron Products

Pipe	Tubing	Weldells*
Special Bending Pipe	Casing	Plate
	Nipples	Bar-iron
	Coupling	Blooms

** Made from Byers Genuine Wrought Iron by The Locomotive Terminal Improvement Company of Chicago.*

BYERS GENUINE WROUGHT-IRON PRODUCTS

AN INVESTMENT — NOT AN OUTLAY

Business as Others See It

Digest of Current Financial and Economic Opinion

ECONOMIC unbalance is seen by many observers as the dragon we must slay. Dr. Anderson, economist of the Chase National Bank, New York, contends that it is the cause of the great depression. Silberling shows a decline from 1929 of 22 per cent in wholesale prices, but only 12 per cent in the cost of living. "Wages fell less than 10 per cent. Wage scale averages are nearly 120 per cent above pre-war, while the cost of living remains suspended about 50 per cent above that level."

On the long-range view, Index Number Institute points out that wholesale prices showed a declining tendency, after the Napoleonic wars and the Civil War, for periods of 35 and 31 years. In both instances the resulting low points were 60 to 61 per cent below the preceding peaks. Today we have reached 52 per cent below the 1920 peak, in 11 years — a somewhat shorter period than the 14 years required for the same measure of decline in both previous cases.

May Have a Period of Better Prices

Based on the historical precedent, that organization thinks we *may* have "a temporary rally of commodity prices amounting to 25 or 30 per cent, in the near future." Meantime business volumes are following the trend of the past five-year average, but at a level 26 per cent below that of the average.

A decline in public works and utility contracts is noted by *Annalist* as "significant of the value of construction as a bad-times remedy. That decline was greater than in other forms of building and engineering works. In the general situation *Annalist* finds seasonal movements only, but at a very low level of activity.

Looking abroad, Harvard Economic Society notes a gradual change for the better in both England and France. But "no immediate recovery can be anticipated." Uncertainty dominates the situation in both countries.

Relative stability of conditions of business activity for many weeks "is strictly encouraging for economic recovery in the not-too-distant future," thinks LaSalle Extension University. "Even the seasonal decline during the summer is not likely to carry us below the levels already reached this year."

That organization thinks that "the speed of economic recovery will depend largely upon the ability of business leaders to adopt and carry out wise policies in adjusting themselves to changed conditions. . . . In the meantime many fundamental readjustments are being more completely made which will enable operations to go ahead with more stable growth, even if at a reduced rate for some time yet."

Low Money Rates Not a Panacea

Cheap money alone will not revive business, particularly when it is a *resultant* of prostration of industry and enterprise. Silberling thinks that this fact "should now be well established for all time." And Colonel Ayres finds many corporations "using some of their funds to purchase their own bonds."

He finds some industries "increasing their outputs, because demand has overrun supply, and shortages are developing. And Alexander Hamilton Institute deplores the "fears that over-expansion of productive capacity is going to be an ill from which no recovery is in sight." With *no* increase in the standard of living, "normal productive activity ten years hence should be greater than that of the abnormal year, 1929."

Commerce and Finance questions the entire adequacy of some of our measuring sticks, thus: "The total of bank clearings has been much diminished by the many bank consolidations during the last two or three years. And part of the reduction in car loadings is due to the efforts the railroad companies are making to increase the total freight carried in each car."

That paper calls attention to the huge buying volume which has attended recent "sales" in large stores. "It is evident that the present disposition is to buy, rather than to sell, and a sensational reduction in stocks is now being rapidly effected at lower prices."

Saving the railroads from bankruptcy or a labor war is argued by *Business Week* as "more important to business recovery than are low freight rates. . . . Quarrels over consolidation questions have crippled [the railroads'] energy and delayed cooperation in attacking the crucial problems which this depression and competing forms of transportation have put up to them."

Bureau of Yards and Docks, Navy Department, Washington, is asking bids until June 24 for refrigerating machinery, including motor-driven ammonia compressor, condenser, liquid receiver, motor-driven brine pump, motor control and instrument panels, safety devices and other equipment for naval station, Guantanamo Bay, Cuba.

Distillazione Italiana Combustibiles, Ltd., Venice, Italy, has awarded general contract to Arthur G. McKee Co., Cleveland, for new oil refining and distillation plant, including process oil refining machinery, etc.

Patons & Baldwin, Ltd., Yorkshire, England, operating a large woolen mill, has authorized erection of branch mill at Toronto, Ont., with installation of motor-driven machinery, conveying and other equipment. Initial unit will be two stories and basement, 180 x 300 ft., and will cost over $500,000 with machinery.

Council of Labor and Defense, Soviet Russian Government, Moscow, has authorized following construction appropriations during present year: Locomotive car and Diesel engine plant, 80,000,000 rubles (about $40,000,000); tractor manufacturing works at Cheliabinsk, including parts and assembling, 50,000,000 rubles (about $25,000,000); combine and agricultural equipment plant at Saratov, 15,000,000 rubles (about $7,500,000); Government Lumber Trust, for mechanizing processes of production at mills, 20,000,000 rubles (about $10,000,000). Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying agency.

Plans have been approved by Aznepht Oil Syndicate of Soviet Russian Government, Moscow, for a pipe line from oil fields at Groszny to different points in Ukraine, totaling 1125 kilometers (about 700 miles), to cost more than $4,000,000 with pumping stations and other equipment. Amtorg Trading Corpn., 261 Fifth Avenue, New York, is official buying station for Soviet Union.

State Department of Public Works, Buenos Aires, Argentina, is planning erection of a series of grain elevators, comprising 10 large main terminals and close to 600 smaller field elevators, with elevating, conveying, screening, and other equipment, to cost over $2,500,000. C. D. Howe, head of C. D. Howe & Co., consulting engineers, Port Arthur, Ont., has presented a report on project to Government of Argentina, and will likely prepare plans.

New Trade Publications

Elevating and Conveying Machinery.—Freeman-Riff Co., Terre Haute, Ind. Illustrated booklet, 17 pages, pictures design and operation of conveying machinery and conveyor systems of all types, for handling bulk materials.

Electric Motors.—Louis Allis Co., Milwaukee. Application of "multi-speed" motors to metal-working, woodworking and other modern production machinery is explained in a 16-page revised bulletin, No. 500A. Bulletin No. 508A describes the "explosion-proof" fan-cooled motor, pointing out its advantages in hazardous industries.

Chains.—Newhall Chain Forge & Iron Co., 9-15 Park Place, New York. Pamphlet No. F-9110 illustrates various types of sling chains and sling parts.